COASTAL ENVIRONMENTAL PROFILE
OF
NORTHWESTERN BOHOL, PHILIPPINES

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Coastal Resource Management Project

of the

Department of Environment and Natural Resources

supported by the

United States Agency for International Development

2000

"This profile reveals anomalies in coastal resource destruction that are highly detrimental to the Philippine well being — let's stop them!"

Anonymous

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ACRONYMS and ABBREVIATIONS

ATI	Agricultural Training Institute
BEMO	Bohol Environment Management Office
BFAR	Bureau of Fisheries and Aquatic Resources
BHW	Barangay Health Worker
BIDEF	Bohol Integrated Development Foundation Inc.
BIPC	Bohol Investment Promotion Center
BSWM	Bureau of Soil and Water Management
BSEZ	Bohol Special Economic Zone
BSPO	Barangay Services Point Office
CARE	Conservation of Rare and Endangered Species
CARP	Comprehensive Agrarian Reform Program
CBCRM	community-based coastal resource management
CBFMA	Community-Based Forest Management Agreement
CBRMP	Community-Based Resource Management Project
CENRO	Community Environment and Natural Resources Office/Officer
CEP	Coastal Environment Program
cm	centimeter
CPUE	catch per unit effort
CREED	Coastal Resource Enhancement through Enterprise Development
CRM	coastal resource management
CRMF	Coastal Resource Management Framework
CRMO	Coastal Resource Management Office
CRMP	Coastal Resource Management Project
CRMS	Coastal Resource Management Section
CVRP - I	Central Visayas Regional Project - I
CVSCAFT	Central Visayas State College of Agriculture, Forestry and Technology
CVWSP	Central Visayas Water and Sanitation Project
CWL	Catholic Women's League
DA	Department of Agriculture
DECS	Department of Education, Culture and Sports
DENR	Department of Environment and Natural Resources
DOF	Department of Finance
DILG	Department of Interior and Local Government
DOJ	Department of Justice
DOST	Department of Science and Technology
DOT	Department of Tourism
DSWD	Department of Social Welfare and Development
DTI	Department of Trade and Industry
ECC	Environmental Compliance Certificate
EIA	Environmental Impact Assessment
FAD	fish aggregating device

FARMC	Fisheries and Aquatic Resources Management Council
FCB	First Consolidated Bank
FLA	fishpond lease agreement
g	gram
GIS	geographic information system
GO	government organization
GOLD	Governance and Local Democracy
GOP	Government of the Philippines
ha	hectare
HVC	high-value crop
ICM	integrated coastal management
ICRI	International Coral Reef Initiative
IEC	information, education and communication
IMA	International Marinelife Alliance
IRA	Internal Revenue Allotment
IRRDP	Inabanga Rural Rehabilitation and Development Project
JICA	Japan International Cooperation Agency
kg	kilogram
km	kilometer
km^2	square kilometer
kW	kilowatt
LEAD	Livelihood Enhancement and Development
LGU	local government unit
LHC	live hard coral
LMP	League of Municipalities of the Philippines
LOGODEF	Local Government Development Foundation
m	meter
m^2	square meter
m^3	cubic meter
MAFC	Municipal Agriculture and Fisheries Council
MAO	Municipal Agricultural Office/r
MARICOM	Maritime Command
mg	milligram
mg/L	milligram per liter
ml	milliliter
MLGOO	Municipal Local Government Operations Office
MLGU	Municipal Local Government Unit
mm	millimeter
MOA	Memorandum of Agreement
MPDC	Municipal Planning and Development Coordinator
MPDO	Municipal Planning and Development Office
MPCI	Multi-Purpose Cooperative Incorporated
m/sec	meter per second
mt	metric ton
mt/ha	metric ton per hectare
MTWG	Municipal Technical Working Group
NAMRIA	National Mapping and Resource Information Authority
NEDA	National Economic and Development Authority

NFA	National Food Authority
NFE	nonformal education
NGA	nongovernment agency
NGO	nongovernment organization
NIPAS	National Integrated Protected Areas System
NSO	National Statistics Office
OPA	Office of the Provincial Agriculturist
PAMB	Protected Areas Management Bureau
PCCD	Presidential Commission for Countryside Development
PCRA	participatory coastal resource assessment
PCRMTF	Provincial Coastal Resource Management Task Force
PCG	Philippine Coast Guard
PD	Presidential Decree
PENRO	Provincial Environment and Natural Resources Office/Officer
PLGU	Provincial Local Government Unit
PNP	Philippine National Police
PO	people's organization
PPDO	Provincial Planning and Development Office
PPFP	Provincial Physical Framework Plan
PROCESS	Participatory Research Organizing of Communities and Education towards Struggle for Self-Reliance
PTA	Philippine Tourism Authority
RA	Republic Act
RICH	Rehabilitation in Conservation Hotspots
RORO	roll on, roll off
SALT	Sloping Agricultural Land Technology
SB	*Sangguniang Bayan*
SEAFDEC/AQD	Southeast Asian Fisheries Development Center - Aquaculture Department
SP	*Sangguniang Panlalawigan*
SRA	Social Reform Agenda
SUML	Silliman University Marine Laboratory
TESDA	Technical Education and Skills Development Authority
TWG	Technical Working Group
μm	micrometer
USAID	United States Agency for International Development

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Municipality of Buenavista
Municipality of Calape
Municipality of Clarin
Municipality of Getafe
Municipality of Inabanga
Municipality of Loon
Municipality of Tubigon
Bohol Environment Management Office
Provincial Planning and Development Office
Provincial Environment and Natural Resources Office
Community Environment and Natural Resources Offices
(Tagbilaran City and Talibon)
Bureau of Fisheries and Aquatic Resources
Office of the Provincial Agriculturist
National Statistics Office

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Any errors and unpopular views that remain are assumed by the authors.

FOREWORD

The Province of Bohol is composed of 47 municipalities and 1 city of which 30 are coastal including Tagbilaran, the capital. Our extensive coastline (642 km) contains a wealth of natural resources including: small islands, coral reefs, seagrass beds, mangrove forests and of course all the associated fisheries in nearshore and offshore areas. All these coastal resources provide livelihood, income and food for our people in the form of fisheries, forestry and tourism. The economic returns from these coastal resource-dependent activities cannot be underestimated.

Recent trends are alarming in this regard. Fish catch in many Bohol coastal areas has declined from what it was 15 or 20 years ago. Habitat destruction, illegal fishing practices and an open-access regime are usually the culprits in this decline. We must pay attention to this decline and its causes. We need to improve the management of our coastal resources, with the local government units (LGUs), fishing communities and other stakeholders as active participants, in order to enhance their awareness of the urgency of protecting these resources and strengthen their commitment to sustain the source of more than 50 percent of their animal protein requirement. Meanwhile, agro-industrialization and eco-cultural tourism, which are given the highest priority among the development thrusts of the province, will be drastically affected if its coastal resources continue to be threatened by all sorts of destruction.

The local governance of Bohol places primary importance on the environment and gives high priority to coastal resource management among its sustainable development thrusts. This is clearly manifested in its vision for the province, to wit: "Bohol is a prime eco-cultural tourist destination and a strong agro-industrial province with an empowered and self-reliant people who are God-loving, law-abiding, proud of their cultural heritage and committed to the growth and protection of the environment."

This coastal environmental profile is one of the first steps in fulfilling Bohol's vision as it provides some basic information upon which to build our plans, strategies and actions. It contains very useful data generated through active community participation in coastal resource assessment. Let us make this profile part of our Bohol data information upon which much improved coastal resource stewardship can be based.

RENE LOPEZ RELAMPAGOS
Governor of Bohol

PREFACE

At first glimpse, the coast of northwestern Bohol consists solely of small islands, sandy beaches, shallow reefs with adjacent seagrass beds, mangrove stands and estuaries. A typical scene of a lush, serene, tropical island paradise. However, upon closer inspection, one begins to see a multitude of barren gaps that have been carved out of the surrounding environment.

While the area's natural resources hold potential for environmentally-sensitive economic development, they are currently in danger of being depleted into a state of nothingness. Past and present human interventions include a plethora of destructive fishing methods, overfishing, quarrying, slash-and-burn farming, sedimentation and water pollution. Over one-third of the total population depend upon dwindling marine resources for their livelihood. The majority of the coastal inhabitants live well below the poverty line in semi-permanent housing, with little access to electricity and potable water, and in polluted areas near critical environmental zones.

Since the northwestern coast of Bohol is a dichotomy of good and bad, it was 1 of 6 areas selected by the Coastal Resource Management Project implemented by the Department of Environment and Natural Resources (DENR) and funded by the United States Agency for International Development (USAID). The thrust of the project is to promote integrated coastal management among the various stakeholders in Bohol, and elsewhere in the Philippines.

Coastal resource management is the process of planning, implementing and monitoring beneficial and sustainable uses of coastal resources through participation, collaboration and sound decision-making. This is reached by involving the entire affected community, including resource users, local and regional government, nongovernment organizations and the private sector. The aim is to promote an integrated coastal management approach that focuses on sustainability in coastal resource use, and minimizes the direct impacts on coastal resources from fishing, aquaculture and tourism. Bohol will serve as 1 of 6 examples of how to implement integrated coastal management in the Philippines.

Preconditions for project success do exist within the area. The communities are aware of issues, largely due to the historical presence of the Central Visayas Regional Project-I (CVRP-I), and the presence of various nongovernment organizations. The dynamic leadership of Gov. Rene L. Relampagos and Vice Gov. Edgar M. Chatto has given top priority to environmental concerns in the development agenda of the province. With them at the helm, and with the collaboration of all concerned sectors, the Bohol Environment Code of 1998

was developed, opening up all kinds of possibilities and interventions towards solving the main issues mentioned above.

Because of the favorable political climate, government agencies at all levels (national, regional, provincial and municipal) closed ranks with various nongovernment organizations (NGOs), people's organizations (POs), the private sector, and the academe to develop strategies in response to the prevailing environmental issues. Meanwhile, recognizing the innovative yet participatory style of leadership and administration adopted by Bohol's new breed of leaders, the USAID supported the province's Governance and Local Democracy (GOLD) project, which advocates for participatory governance and full implementation of the Local Government Code. Many other foreign-assisted projects have been launched in Bohol and attained varying degrees of success in their implementation.

The integrated approach of participatory coastal management for the profile area has proven successful in other areas of the Philippines, and in other Asian countries. This approach depends on the dynamic actions of community groups with local and national government agencies responsible for resource utilization in the area. This management approach does not dictate to the people, but rather, equips them, who rely the most upon the coastal environment, with the necessary tools to make rational and sustainable decisions. The first step in this process is the development of baseline information for planning. This profile completes this step for northwestern Bohol.

Chapter 1
INTRODUCTION

LOCATION

The province of Bohol is 1 of 4 provinces comprising the Central Visayas, a group of islands located in the center of the Philippine archipelago. Lying approximately 30 km away from Cebu City, Bohol belongs to Region VII, 1 of the 14 geopolitical subdivisions of the Philippine government. The island lies between Southern Leyte to the northeast, Cebu to the west and northwest and Mindanao to the south. The northern coast is bounded by the Camotes Sea, while the southern and western coasts are bounded by the Mindanao Sea and Bohol Strait, respectively.

With a total land area of 411,746 ha, Bohol is the tenth largest island in the country (PPDO 1993a). Unlike the other islands in the region, Bohol is generally flat in topography. Level to moderately-rolling land accounts for 47 percent of the total land area. With a population of 1,159,680 (NSO 1995), Bohol consists of 1 city (Tagbilaran, the capital) and 47 municipalities. Eighteen of the municipalities are upland, while the remaining 30 (including Tagbilaran) are coastal. There are 349 coastal barangays with a total coastline of approximately 642 km. About 6,427 km^2 of municipal waters surround the province and its 72 smaller islands (water/land ratio: 2.8) (Courtney and Traub 1999) (see Figure 1.1). There is, therefore, 2.8 times more sea than land for the province to manage.

This profile covers 7 of the northwestern municipalities. Moving northwards from Tagbilaran City, these profile areas are: Loon (a project expansion site), Calape, Tubigon, Clarin, Inabanga, Buenavista and Getafe (another expansion site). The outer edge of the profile area is approximately 20 km from the capital. These 7 municipalities have a total population of 197,463 (NSO 1995) and a total land area of 60,499.5 ha.

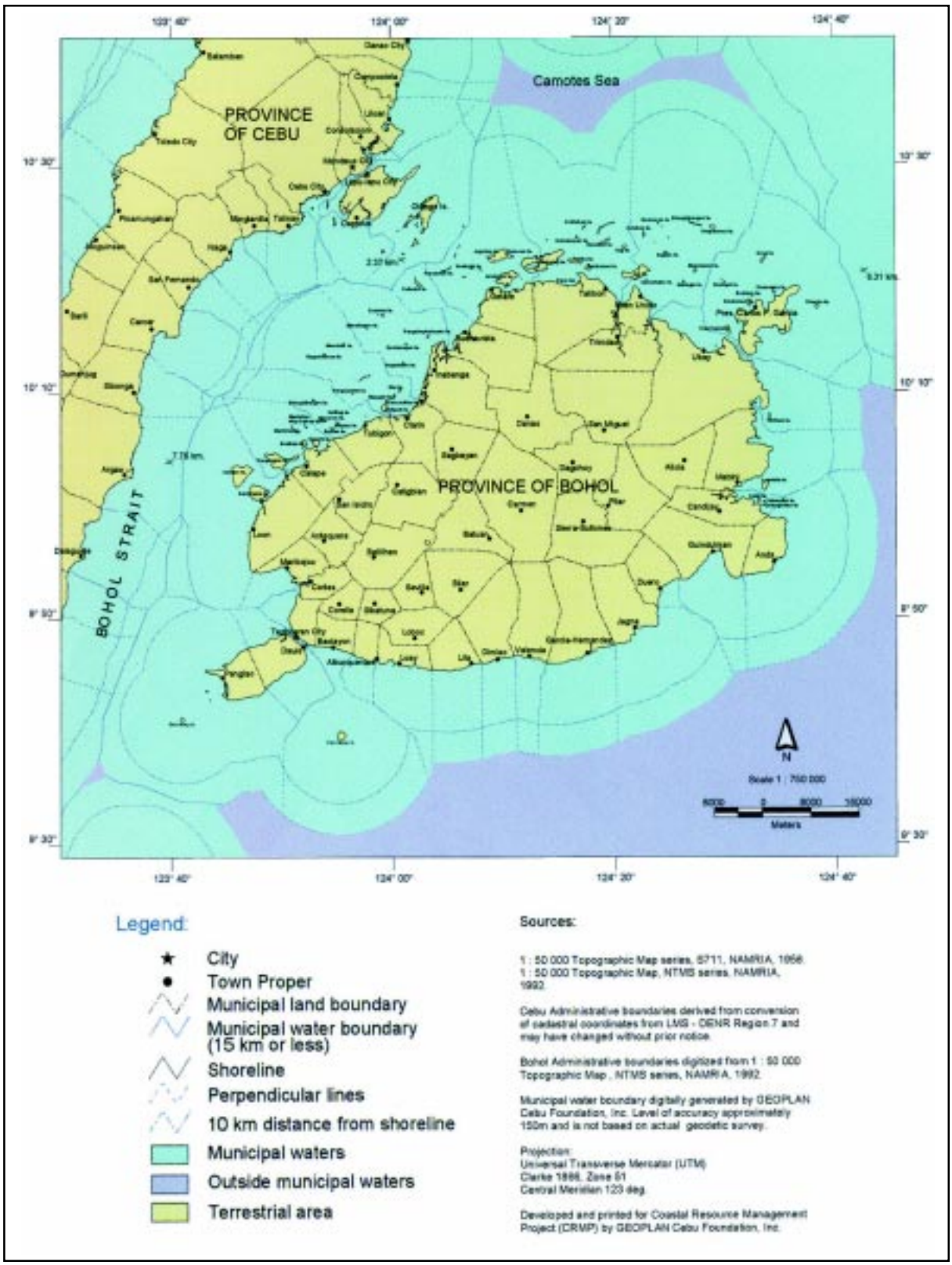


Figure1.1. Municipal water boundaries of Bohol (unofficial map).

This coastal environmental profile is focused on the coastline (and coastal communities) of these municipalities. The coastline in question is approximately 85 km long, stretching from the southernmost boundary of Barangay Song-on in Loon to Tulang Point in Getafe.

AREA GEOGRAPHY

The profile area has 6 natural zones: upland (hills and mountains); lowland (plains); mangrove; beach and exposed coast; shallow nearshore (intertidal flats, seagrass and algal beds, coral reefs) and open water.

The profile area falls within 3 major watershed areas and has 1 major riverine system. The Mualong and Abatan watersheds touch Calape, while Tubigon and Clarin fall within the Abatan watershed area. The Iwahig-Inabanga watershed contains Inabanga and Buenavista, along with the Inabanga river system. The total area of drainage coverage is approximately 1,330 km^2 (PPDO 1993a).

The northern boundary of the profile area is fringed by the only double barrier reef in the Philippines and the entire area is bounded by mangroves and seagrass beds. This barrier reef, known as the Danajon Bank, has inner and outer reefs and lies about 7 km off the northern coast of the mainland. It consists of small flat and low-lying islands, with reef widths averaging from 100 to 200 m.

Within the profile areas, there are also 4,196 ha of mangroves, and approximately 555 ha of seagrass beds at depths ranging from 0 to 3 m (SUML 1997). The ebb current runs in a southwesterly direction.

SOCIOECONOMIC BACKGROUND

Agriculture and fisheries drive the economy of Bohol in general, and the profile area in particular. Roughly 55 percent of the households in the area derive their income as farmers, farm workers or fishermen. The major fishing grounds in the profile area are the Bohol Strait (between Cebu and Bohol), Olango Channel and Danajon Bank. In addition, Calape Bay is a rich fishing ground for demersal species, especially siganids (rabbitfishes).

The 1990 National Statistics Office (NSO) Census showed that 88 percent of the households in the area earned below the regional poverty line of 30,000 pesos per year (as determined by the National Economic and Development Authority (NEDA)). The distribution of income was as follows:

Percentage of Population	Annual Income (pesos/year)
32	< 10,000
26	10 - 15,000
14	15 - 19,000
16	20 - 30,000

US$1 = P20 in 1990

Typically, those people involved in fishing and fisheries-related activities earn below PhP 48,000 per year, with about half earning an average monthly income of PhP 1,830. This means that many, if not most, fisherfolk are currently living below the poverty line and cannot meet most minimum social and economic needs, such as adequate food, shelter or health care.

SUMMARY OF ISSUES

Bohol has many of the problems and conditions along its northwestern coast that are salient to key coastal issues in the Philippines. The northwestern coastline contains declining fish stocks, critical coastal habitats, variable beaches and water quality, and dwindling coastal forests and upland areas. The resources and ecosystem along the coastline are, in some cases, in relatively good condition, while some areas are being degraded and others are in danger of destruction.

The area along the northwestern coast is biologically diverse, and there exist linkages between coastal issues and upland agriculture, forestry and mining (i.e., siltation and run-off).

Problems that have been identified in the profile area are caused by, and perpetuate, the poverty of the coastal communities. Five major categories of issues which require immediate management attention are:

- Poverty-driven overfishing by local resource users, compounded by the presence of fisherfolk from outside the profile area;
- Destructive fishing techniques;
- Pollution due to improper waste disposal from expanding urban areas and industrial infrastructure development;
- Run-off and siltation from upland areas due to inappropriate land management techniques; and
- A lack of coordinated planning and enforcement, and weaknesses in institutional capacities.

OBJECTIVES

Coastal resource management (CRM) is the process of planning, implementing and monitoring beneficial and sustainable uses of coastal resources through participation, collaboration and sound decision-making. This is reached by involving the entire affected community, including resource users, local and national government, nongovernment organizations (NGOs) and the private sector. The aim is to promote an integrated coastal management (ICM) approach along the northwestern coastline of Bohol that focuses on sustainability in coastal resource use and minimizes the direct impacts on coastal resources from fishing, aquaculture and tourism.

Communities and local government units (LGUs) will collaborate in the development of integrated management plans for area resources. Community groups and LGUs will be the main participants and beneficiaries of pilot projects and the process as a whole. This coastal environmental profile is an initial step in identifying management issues to be addressed in municipal and area-wide plans, and ongoing projects implemented by local communities and government. It contains a broad perspective on the physical, biological and socioeconomic characteristics, the institutional and legal framework, and the issues and opportunities for management. It also provides an information base for monitoring changes in the area, conducting education programs and planning appropriate activities.

The objectives of this profile are to:

- Identify major resource management issues to be addressed by LGUs and communities;
- Identify constraints, opportunities and objectives for management and development of coastal resources associated with profile areas;
- Summarize and assess information on ecosystem and resources, social and economic conditions, and legal and institutional regimes for management;
- Provide a source of information for communities, government, planners, researchers and others involved in the planning and education process;
- Synthesize mapped information which will constitute a visual database for spatial analysis;
- Compile baseline information for monitoring and assessing trends in environmental changes; and
- Provide a source of information for Environmental Impact Assessments (EIAs) of development projects in the profile area.

Information for this profile was collected from secondary sources such as reports, maps, government files and photographs. Primary sources include short-term site surveys, interviews with local resource users, LGUs and community discussions; as well as the participatory coastal resource assessment (PCRA) conducted in the area in 1997 and 1998.

SCOPE

This coastal environmental profile covers an area comprised of 7 municipalities along the northwestern coastline of Bohol. It describes the overall social, cultural, political, legal, economic, agricultural and environmental aspects of the profile area that will have bearing on an integrated management approach to the coastal resources of concern.

Chapter 2
PHYSICAL FEATURES

This chapter provides background information on the geography, hydrology, land uses and climatic condition along the northwestern coastline of Bohol province.

LAND AREA AND TOPOGRAPHY

The profile areas cover 60,499.5 ha and have a coastline of approximately 85 km (Table 2.1). The topographic characteristics of the municipalities are: active tidal flats, alluvial plains, karst plains, high rolling hills, river terraces and undulating terrain. According to the Bureau of Soil and Water Management (BSWM), 40 percent of the land in the profile area is considered to be non-susceptible or moderately susceptible to erosion, while 60 percent is very susceptible to erosion. The estimated rate of land erosion is 10 m^3/ha annually (PPDO 1997). This is attributed to the lack of sufficient vegetative cover in the upland areas. Improper upland farming practices and deforestation are identified as the major causes of this problem.

Mangrove areas and seagrass beds fringe the entire northwestern coastline of Bohol. There are a multitude of small islands within the 15-km municipal waters radius. The Danajon Bank at the northernmost tip of Getafe is a well-defined structure that lies 7 km offshore. The outer barrier, Caubyan Reef, is composed of several units, up to 14 km long. The inner barrier, Calituban Reef, is 1.5 km wide and separated from the littoral by an inshore channel approximately 28 m deep.

Ebb currents in the profile area run southwesterly, with speeds ranging from 0.174 to 0.430 m/sec. Ebb currents are stronger than flood currents which have speeds ranging from 0.046 to 0.155 m/sec. In general, flood currents maintain the same direction as ebb

Table 2.1. Municipal land areas of the profile area (PPDO 1993a).

Municipality	Land area (in ha)
Calape	7,615.0
Tubigon	7,556.0
Clarin	6,279.0
Inabanga	13,166.0
Buenavista	8,300.0
Getafe	6,386.0
Loon	11,197.5
Total	**60,499.5**

currents, except for the northernmost end of the area, where the flood current reverses to a northeasterly direction (SUML 1997). This suggests that ebb currents are a significant water mass transport along the northwestern coast.

HYDROLOGY

Temperate in climate and rainfall, Bohol has lush watersheds which affect the present and future conditions of the coastal zone. As mentioned earlier, there are 3 major watershed systems covering the profile area, including the Inabanga river system in the north (PPDO 1993a). Unfortunately, the watershed areas are currently experiencing 26-83 percent erosion due to uncontrolled human encroachment into protected upland forest areas (MTDP 1997).

Currently, there are 7.8 km of irrigation canals being designed along Getafe's Campao creek, and 7.3 km in Taytay creek. A 13.3-km canal is being developed on Talenseras creek in Tubigon. Calape has 2 canal systems being developed along the Calunasan (10.2 km) and Mandaug creeks (7 km). Buenavista has 5 km along the Bunotbunot river. These projects, totalling 50.6 km, began in 1996 under the Small Reservoir Irrigation Project (PPDO 1993a). There are additional projects scheduled for Clarin and Inabanga.

Five major waterways lie in the profile area. These are the Iwahig, Daet, Mualong, Baogo and Haligue rivers. A number of smaller rivers are used for hydroelectric power and irrigation projects. Table 2.2 provides a complete list of rivers and creeks in the profile area.

SOIL

On the average, soil depth is relatively shallow, ranging from a minimum depth of 24 cm to a maximum of 60 cm (Table 2.3). Of the 4 major soil types in the area, the most prevalent is clay. The soils are divided among: Bolinao clay, clay loam, Bantug clay and hydrosoil (regosols). Since clay soil has an extremely fine texture, it has the ability to retain large amounts of water and store plant nutrients at the surface. This makes clay, and especially organic clay loam, highly suited to agriculture. Due to the shallow soil depth, however, agricultural practices must be carefully managed to limit soil erosion and depletion. Of the 7 municipalities, only Tubigon is well suited to support a strong agricultural base.

Table 2.2. List of rivers, springs and creeks in the profile area (PPDO 1992).

Municipality	River	Spring	Creek
Loon	Mualong	Tubig-Loon Bagacay	Lapay Pondol
Calape	Batuan Abucayan	Banlasan Binogawan Cabayugan Cabudburan Camias Canguka Sokotong Tinibgan	Talisay Bato Bolokbolok Calunasan Mandaug Boho
Tubigon	Cahayag Bunacan	Cawayanan	Banlasan Ilihan Ubojan Talenseras Buacao Libertad Dapanas
Clarin	Bacani Cabog		Cantuyod Poblacion Caboy Candahik Tangaran Binaliw
Inabanga	Iwahig Nahawan Baogo Cawayan		Ilihan Magkaya Gatusan Cramian
Buenavista	Bunotbunot Daet Maubid		Matubig Bugaong
Getafe	Montegarcia		Campao Taytay

Table 2.3. Average soil depth per municipality (PPDO 1993a).

Municipality	Soil depth (in cm)	Classification
Buenavista	25	shallow
Calape	24	very shallow
Clarin	24	very shallow
Inabanga	24	very shallow
Getafe	25	shallow
Tubigon	60	moderately deep
Loon	28	shallow

LAND USES

Land use refers to the manner in which an area of land is actually being put to use. Land suitability is a classification of land into categories based on the degree to which the characteristics of the land can satisfy the environmental requirements of settlements, forestry, agriculture and industry without deterioration.

Under the classification system designed by the Department of Environment and Natural Resources (DENR) and the Department Agriculture (DA), land classified under sustainable land use is utilized in accordance with its suitability. Development opportunity land is utilized at a level of intensity that is below the suitable intensity. Land that is not sustainable is utilized at a level of intensity that is in excess of its suitability (AusAID 1995).

Much of the land within the profile area is classified as being either sustainably utilized, or underutilized (development opportunity land). The entire coastline of the profile area is currently classified as development opportunity land. This means that the land is currently being utilized at a level of intensity that is below the suitable intensity (as defined by the DA and DENR). Much of this development opportunity coastline is classified as being suitable for forestry plantation. The implication of this classification is that agro-forestry projects (such as community-based mangrove stewardship) in the area can be stepped up to meet the livelihood needs of the coastal population.

As of now, mangroves and marshes are the predominant feature in this underutilized area. Inland from the development opportunity fringe, there are vast areas classified as sustainably used areas. This implies that the land is being utilized in accordance with its suitability. In this case, the majority of sustainable land is currently utilized for rice farming or fishpond development.

Since a high percentage of the profile area's population is rural, the impact of human settlements upon the land is not considered to be high by local government officials. Currently, the majority of municipal urban centers sprawl across rice land and mangrove areas. This means that future urban growth (due to population pressure) will infringe upon the wetlands, causing sustainability to decrease as a result of human waste and pollution. The resulting loss of sustainability may cause drops in agricultural productivity, and further degrade the coastline.

CLIMATE

The climate of Bohol is characterized by 2 distinct seasons. The dry season occurs from late January to May, while the wet season is from June to December. Average annual precipitation is 200 cm per year. Temperature typically ranges from 26 to 29°C, depending upon the season (PPDO 1993a; DOT 1997). Due to the slight variations in temperature, Bohol is able to produce agricultural crops year-round, rather than being restricted only to specific growing seasons.

Relative to the suitability of the profile area's climate to agricultural production, the BSWM identified 2 agro-climatic zones within the profile area. Calape and Tubigon are under the moist zone, in which annual rainfall ranges from 1,500 to 2,500 mm and occurs mostly on upland areas. The moisture deficit during the dry season is moderate. The

municipalities of Clarin, Inabanga, Buenavista and Getafe fall within the dry zone, where annual rainfall is less than 1,500 mm and occurs mainly on the lowlands (PPDO 1993a). These areas experience significant moisture deficit during the dry season.

As a result, agriculture in Calape and Tubigon is naturally able to sustain a greater variety of crops as compared to the other 4 municipalities, which must place greater dependence upon irrigation schemes. In addition, since Tubigon has a deeper soil base, agricultural schemes in that municipality have greater potential for successful diversification.

SUMMARY

Northwestern Bohol should be able to sustain year-round agricultural crop production because of its favorable agroclimatic situation. Also, its coastline is classified as development opportunity land thus suitable for livelihood activities. As long as sustained agricultural practices do not deplete soil fertility or topsoil, agricultural production in the profile area is encouraged. The relatively shallow soil base, however, will limit the longevity and effectiveness of the soil when used for sustained agricultural purposes. This concern calls for careful attention to soil management practices especially as farmers attempt to increase production for a rapidly expanding population. On the other hand, if current trends in soil erosion continue, the problem of siltation and sedimentation of coastal and marine areas will increase.

Chapter 3
NATURAL RESOURCES

MINERAL RESOURCES

Mineral deposits in Bohol consist mainly of copper, manganese, phosphate and guano (PPDO 1993a). Bohol is historically known for a certain permissiveness regarding mineral exploitation, which could lead to widespread excavation, destruction of habitat and watershed, and erosion. A classic example of this was the quarrying of the tourist-attracting Chocolate Hills, now declared as a national monument area where all forms of extraction have been averted.

In the profile area, Getafe and Buenavista are reported as containing deposits of copper, manganese and silica sand. In fact, Getafe is reported to have a positive reserve of 53,900 mt of clay silica. Buenavista is also known for siliceous clay. Clarin and Inabanga both have guano and phosphate deposits, while Tubigon is a source of red burning clay. Loon has deposits of limestone and silica. The province uses 4 major sites as sources for construction project materials (PPDO 1993a). These are Lapacan Quarry, Inabanga; Cawayan River, Inabanga; Macaas Quarry, Tubigon; and Calunasan River, Calape.

There have been reports of sand quarrying in Clarin and Tubigon to be used as beach filler on Mactan Island, Cebu. This has resulted in the alleged disappearance of several small islands and beaches in the profile area, which contributes to coastal erosion, loss of habitat for both wildlife and humans, and loss of potential revenue from tourism.

FOREST RESOURCES

Based on the data gathered by the Provincial Planning and Development Office (PPDO), there are no major forest resources within the municipal boundaries of the profile area. The only exception are mangrove stands under the land classification of "protection forest".

COASTAL RESOURCES

Mangroves

The overall mangrove coverage in the profile area is approximately 4,196 ha (SUML 1997). The largest single area appears to be in Clarin, with a reported coverage of 318.61 ha. Much of the observed mangroves are secondary growth. A total of 27 different species of true mangroves and associated species belonging to 15 families have been observed in the area (Table 3.1).

Fourteen different species were identified in Calape, while Inabanga and Clarin each have 12 species. Getafe has 10 different species and Tubigon has 9. There is no confirmed species identification for Buenavista; however, an estimated 400-500 ha of mangrove cover occurs within the municipality. Overall, the mangrove habitat in northwestern Bohol can be rated as fair to good, even though most is secondary growth.

The densest overall mangrove saplings reported by Silliman University Marine Laboratory (SUML) are in the Clarin-Tubigon area. Clarin has a density of 9,735 stems of *Lumnitzera littorea* per ha; 8,125 stems of *Avicennia alba* per ha and 3,750 stems of *Ceriops decandra* per ha. Tubigon and Inabanga have mean sapling densities of 5,520 and 9,375 stems of *A. marina* and *R. mucronata*, respectively, per ha. The SUML sample site with the highest density of seedlings is on Pangangan Island, Calape, with 90,000 stems of *Rhizophora* per ha. This extremely high seedling density is indicative of a massive reforestation effort. Bohol is well known for its community-based mangrove reforestation efforts, where "...traditional or non-destructive fishing within mangrove areas is still important...".

Getafe's Banacon Island has an extremely high number of stems/ha (11,350) and an overall basal area of <5 - 40 cm. Massive reforestation has occurred here by the local community with assistance from the DENR, DA and the Central Visayas Regional Project - I (CVRP-I).

The reforestation began in the late 1950s, when an inhabitant of Banacon -- Mr. Denciong Paden -- began planting *Rhizophora* as a livelihood endeavor. By the 1980s, the island had already achieved recognition for the national and international significance of its mangrove cover. At that time, the DENR, DA and CVRP-I all began operations in the area. Mr. Paden was later sponsored by the DENR as the Philippine winner of the 1991 "Trees for Life" Award for the largest reforestation project in Southeast Asia (covering over 250

Table 3.1. Mangrove and associated species in the profile area (SUML 1997).

Families/Scientific Name	Common Name	Distribution*				
		Ca	Tu	Cl	In	Ge
1. RHIZOPHORACEAE						
Rhizophora mucronata	*bakhaw baye*	x	x	x	x	x
Rhizophora apiculata	*bakhaw lake*	x			x	x
Rhizophora stylosa	*bakhaw tigre*					x
Ceriops tagal	*tungog, tangal*					x
Ceriops decandra	*hangalay, lapis-lapis*	x	x	x	x	x
Bruguiera gymnorrhiza	*busaing*		x			x
2. AVICENNIACEAE						
Avicennia marina	*piyape baye*	x	x	x	x	x
Avicennia officinalis	*piyape lake*		x	x	x	
Avicennia alba	*piyape lake*			x	x	
Avicennia lanata	*piyape*		x	x		
3. SONNERATIACEAE						
Sonneratia alba	*pagatpat*	x			x	
Sonneratia caseolaris	*pedada*				x	x
4. COMBRETACEAE						
Lumnitzera littorea	*mayoro*		x		x	
Lumnitzera racemosa	*sagasa*				x	
Terminalia catappa	*talisay*	x				
5. MYRSINACEAE						
Aegiceras corniculatum	*saging-saging*			x		x
6. PALMAE						
Nypa fruticans	*nipa*		x	x	x	
7. EUPHORBIACEAE						
Excoecaria agallocha	*alipata, buta-buta*	x	x	x	x	x
8. MELIACEAE						
Xylocarpus granatum	*tabigi*	x		x		
Xylocarpus moluccencis	*piyagaw*			x		
9. LYTHRACEAE						
Pemphis acidula	*bantigi*	x				
10. MYRTACEAE						
Osbornia octodonta	*tualis*	x				
11. BIGNONIACEAE						
Dolichandrone spathacea	*tui*	x				
12. LECYTHIDACEAE						
Barringtonia asiatica	*bito-bitoon*	x				
13. FABACEAE						
Prosopis vidaliana	*aroma*		x			
14. GOODENIACEAE						
Scaveola frutescens		x				
15. PANDANACEAE						
Pandanus sp.	*pandan*	x				

**Ca - Calape; Tu - Tubigon; Cl - Clarin; In - Inabanga; Ge - Getafe*

ha). Even though Mr. Paden recently passed away, he will always be remembered by the island's beautiful winding boat canal dubbed "Paden's Pass."

Avicennia marina, Rhizophora mucronata, Ceriops decandra and *Exoecaria agallocha* are the most commonly occurring species in the area. Additionally, many of the mangrove stands are inter-planted with *nipa* (*Nypa fruticans*). *Nipa* is locally used for making roof thatch.

Local uses of mangroves are for poles for fencing and fish weirs, as well as for charcoal and firewood. While wood is cut for the construction of *bancas* (boats) and houses, there is little or no extraction of timber by commercial establishments. The fruits, bark and leaves are used for food, medicine and animal fodder. Fish and crustaceans are captured in the fringes of mangrove areas and some areas within the habitat are used for the illegal construction of fishponds, especially for milkfish and prawns. Additionally, many fishing communities realize the importance of mangrove stands as a buffer against coastal erosion caused by incoming waves, especially during the peak typhoon season of September-January.

Mangroves help to sustain coastal fisheries by providing feeding, breeding and nursery grounds for fish and for invertebrates such as shrimp and mollusks. Detritus and nutrients that accumulate from litter of decaying plants are consumed by marine organisms, or exported by tides to nearby aquatic ecosystems. In addition, silt and sediments are trapped as they come from the land and help prevent erosion of the shoreline (B2DMP 1997). Mangroves also support reptiles, amphibians and other wildlife, and serve as a potential source of materials for the production of pharmaceuticals. Invertebrates in the mangrove areas are gleaned during low tide.

Mangrove-associated flora in the profile area consists of 2 species of algae (*Bostrychia* and *Padina*) and 6 species of seagrasses. Mangrove soils are basically sandy and of various grades; therefore, *Rhizophora* is the dominant vegetation. Sand contributes to the majority of mangrove soils in the Bohol profile area. The deposition of this substrate type is attributed to the tidal inundation of the weathered fragments of corals and other materials from the seabed.

In the past, white herons, wild honeybees, Philippine cockatoos, bats and monkeys used to inhabit the mangroves. Now, the increasing encroachment of humans into mangrove areas has driven most of these animals away.

Seagrass and Algal Beds

The nearshore area is mainly a seagrass zone. Even the intertidal areas between small offshore islands are generally composed of seagrasses, followed by *Sargassum* beds and/or coral patches and reefs. Seagrasses favor sand and silt substrates, while the *Sargassum* usually colonizes degraded or dead corals and limestone.

Seagrass beds in the profile area comprise approximately 555 ha found at depths of 0 to 3 m (SUML 1997). Six species of seagrasses have been identified in the profile area. These species are: *Cymodocea rotundata, Enhalus acoroides, Halophila ovalis, Halodule pinifolia, Halodule uninervis* and *Thalassia hemprichii. Sargassum* beds dominate at deeper depths with a biomass of approximately 37.25 g dry weight/m^2. It is seasonal and most abundant from April to October.

Forty-nine different species of algae in 16 families also inhabit the area. Twelve species are green algae (*Chlorophyta*),20 are red (*Rhodophyta*),15 are brown (*Phaeophyta*) and 2 blue-green (*Cyanophyta*).

Vegetation is generally determined by substrate, which partly explains the differences in dominance patterns and species composition within a given area. Seagrasses favor sand and silt substrates, while *Sargassum* is more prevalent in areas with limestone or dead corals.

Thalassia hemprichii and *Cymodocea rotundata* are the 2 most dominant species of seagrasses on the northern side of the profile area. The largest and most dense seagrass bed noticed is off Getafe on Banacon Island. This area has a mean cover per m^2 of 35.3 percent of *Thalassia hemprichii*, 12.28 percent of *Enhalus acoroides* and 10.55 percent of *Cymodocea rotundata* (SUML 1997).

Calape has the greatest diversity of algae, with 35 species, while Getafe has the least diversity with 8 species. Seaweeds such as *Eucheuma* species, *Gracilaria* species, and other algae are typically sold to middlemen from Cebu at PhP 3 - 9/kg (dried) depending on species, demand and season. Within the area, *Sargassum* is typically used to feed hogs and other livestock.

Density and coverage is important because seagrass and algal beds are rich sources of macroinvertebrate secondary life. The majority of these are not economically important but have important ecological roles. A total of 110 species of macroinvertebrates belonging to 6 phyla are identified as inhabiting the profile area (SUML 1997). The phyla are: *Porifera* (sponges), *Annelida* (worms), *Mollusca* (mollusks), *Arthropoda* (arthropods), *Echinodermata* (sea urchins and seastars) and Mytiloida (mussels/pen shells).

The municipality of Inabanga reportedly has the richest species diversity, with 34 macroinvertebrates, along with Calape (30 species). Economically important species (such as the bivalves *Septifer* and *Pinctada*) are found in the intertidal areas of Inabanga.

Nearshore

The majority of the nearshore area is a soft-bottom community, with an estimated area of 7,463 ha. Sites on the mainland are primarily composed of fine textured sand with grain sizes of less than 125 μm, while island sites are composed of coarse sand (SUML 1997).

In general, the soft-bottom areas are dominated by polychaetes. Other organisms include crustaceans. Of the polychaetes, spionids are the most represented family in terms of number of species (6) and density (as many as 108 organisms/0.02 m^2).

Open Waters

Plankton composition of open waters off the area is dominated by zooplankton (62.28 percent).The zooplankton community consists of tintinnids, nauplii, copepods, larvaceans, gastropods and bivalves. Other groups include diatoms (31.35 percent), dinoflagellates (7.13 percent) and other algae (0.24 percent).

The phytoplankton community is mainly made up of diatoms, blue-green algae and dinoflagellates. The diatoms are composed of 58 species, of which *Coscinodiscus*, *Rhizosolenia* and *Thalassionema* are the most abundant. A blue-green algae, *Trichodesmium*, is also common in the area.

Forty-seven species of dinoflagellates belonging to 20 genera are present. These include some species known to be toxic in causing red tide such as: *Alexandrium*, *Ceratium*, *Dinophysis*, *Gambierdiscus*, *Gonyaulax*, *Noctiluca*, *Peridinium*, *Protoperidinium* and *Pyrodinium*. These toxic algae are potentially detrimental to human health when they affect bivalves and other marine organisms commonly eaten (SUML 1997).

While most of the identified dinoflagellate species are not toxic, their potential blooms can result in the lowering of water quality. Even a non-toxic bloom still results in an enormous amount of organic matter decomposing in the water. Large amounts of organic matter decomposition can cause anoxia (deoxygenation) due to high biochemical oxygen demand by the decomposing life forms. Once the level of dissolved oxygen drops below 5 mg/L, fish and other marine species become stressed and may die. The blooms also increase the ammonia level (a by-product of decomposition) in the water. Such algal blooms are sometimes triggered by increased sediment or nutrient loads from shoreline run off.

Corals

Except for those in Danajon Bank, the majority of the coral reefs of northwestern Bohol are fringing reefs with widths from 100 to 200 m. Substrate composition is defined by rubble, sand and rock, while seagrasses flourish at the shallower portion of the reefs. One hundred twelve identified species of scleractinian corals belonging to 14 families abound in the municipal waters of the profile area. Eleven species of non-scleractinian and certain soft corals are also present in limited areas (SUML 1997). There are large areas that have not yet been sampled.

Through random quadrat surveys in selected sites, a mean live hard coral (LHC) cover of 31.35 percent has been determined. Rating the coral habitat in profile area waters, one would have to give it an overall rating of fair to poor only.

High LHC cover can be found in Inabanga (58.75 percent; good condition) and Tubigon (40 percent; fair condition). The lowest values are in Buenavista and Calape (15.3

percent for both), where the sand composes a distinct portion of the reef (25.38 percent relative cover). Coral habitats in Buenavista and Calape are rated as poor.

Good coral growth appears to be concentrated on the reef slopes. The reefs also have an overall cover of 4.05 percent of seagrasses, 10.2 percent of other fauna (sea ferns, seaweeds, sponges), 15.57 percent of rubble, 15.64 percent of sand, 4.48 percent of silt and 14 percent of rock.

Coral diversity in the profile area, coupled with overall coral growth, provides a nurturing habitat for over a hundred different species of fish. Inabanga and Tubigon have the highest recorded number of coral species (65 and 63). Calape has 53 species, while Getafe and Buenavista have 45 and 31 species, respectively (all low by Philippine standards).

The relatively low coral diversity plus the high coral rubble indicates physical destruction of the reef from various destructive fishing methods, and other natural factors such as typhoons. The local term for corals is *"bato"*, which means "stone". This misconception illustrates the people's perception of a coral as non-living and that it has little biological or economic value. People use corals for construction purposes. Indeed, most piers in the profile area are made of collected coral heads (such as Buenavista's). In the past, families attending Sunday Mass were told to bring at least 1 coral head to church to help build the massive churches which now stand proud in every town of the profile area. In Loon, where a garments industry is well established, there have been reports that corals are used in a process called stone-washing to create a faded look for denim pants.

Fish Diversity and Abundance

With respect to fish standing stock, SUML conducted a visual census of 130 species belonging to 26 families. All the species were either reef, or reef-associated. Inabanga has the most with 52 species in 16 families. Getafe has the least with 24 species in 12 families, as well as the lowest species richness and lowest average abundance. These numbers are all low by Philippine standards because of heavy fishing pressure and generally poor coral cover noted above.

According to SUML surveys, the 2 families of fish with the most number of species are Pomacentridae (damselfish; 33 species) and Labridae (wrasse; 20 species). Both families are fairly common in coral reefs and are generally small in size. They are typically not targeted as food by fisherfolk as they have little food value. Pomacentrids belong to the lower trophic levels, where they feed mostly on benthic algae and plankton. Labrids range in size from 5 to 229 cm. They also belong to lower trophic levels, feeding on benthic invertebrates, coral polyps, small fish and detritus. Occasionally, some labrids may grow large enough to be desirable subsistence food. Apparently, the depleted state of the coral reefs along northwestern Bohol has turned the attention of fishers to these less desirable species as an available source of food.

The only large predatory species observed was *Lutjanus decussatus* of the family *Lutjanidae* (snapper). Its density was very low (less than 1 per 500 m^2), which indicates extreme overfishing in the area. These large predatory fish are highly priced, and vulnerable to various fishing gears including hook and line, traps and spearfishing. Because of this, they are regarded as good indicators of fishing pressure on coral reefs.

Other fish desired by fisherfolk include 24 target species, most of which are reef-associated. The average biomass, as estimated by SUML, of these target species was 203.32 g. The highest biomass (524.86 g) was found off Inabanga, which had the highest percentage of coral cover in the profile area. On the other hand, Getafe had the lowest biomass (15 g), as well as the lowest species richness and density of reef-associated fish. It should also be noted that Getafe has a relatively low coral cover. This limited incidence out of 24 target species is troubling, because it means that almost all of the target species are missing, which is yet another indicator of overfishing in the area. This number of target species is very low compared to healthy coral reefs not being overfished.

The absence of other large predators, such as families of grouper (Serranidae), bream (Lethrinidae) and jacks (Carangidae) may be due to the reputedly rampant illegal fishing. Dynamite and cyanide fishing is still prevalent in the whole profile area, with residents of Getafe and Calape reporting dynamite blasts of up to 18 per day. This method of fishing takes advantage of high fish density, but harms the relatively high coral cover found there. The use of trawls which drag on the substrate is another destructive fishing method which is very efficient and contributes to the overall degradation of habitat and lowering in fish stock.

During test-fishing (gill net) surveys by SUML, most of the species of fish measured less than their respective commonly-caught sizes. They were also shorter than their respective maximum lengths. This is another indication of intense fishing pressure in the area, where even the small, young fish are captured. While this may provide a current source of food and market income, it threatens to lower fish catch (and human welfare) in the future. Even now, the small fish sold in the market command low prices, which is beginning to disrupt local income patterns. Catching young fish is very inefficient. It wastes the fish and disallows them from spawning to produce the next generation.

Results of Participatory Coastal Resource Assessment (PCRA)

The results of barangay and municipal level PCRAs in 1997 and 1998 for the 7 municipalities from Loon to Getafe are presented in Figures 3.1 to 3.8. Important habitats are mapped as well as resources, uses and issues. It is noted that coral reefs and seagrass beds are dominant features of this coastline. The resources and their uses are similar throughout the 7 municipalities. Management issues persist with major concerns being overfishing, use of destructive methods, poor law enforcement and others as noted. The maps in Figures 3.1 to 3.8 can serve as a baseline for habitat management in the area and are generated by a geographic information system (GIS) for future updates and use.

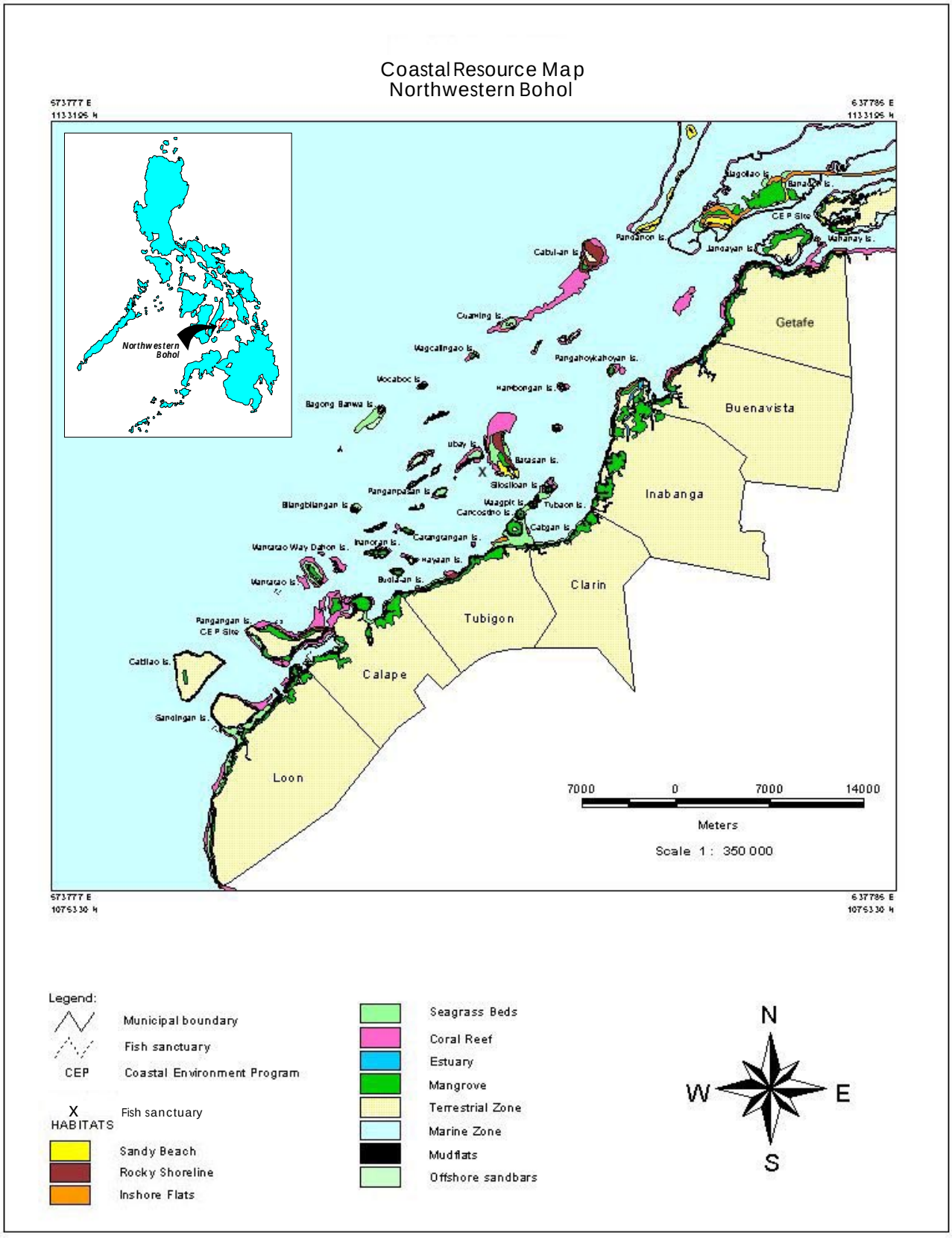


Figure 3.1. Coastal resource map of northwestern Bohol.

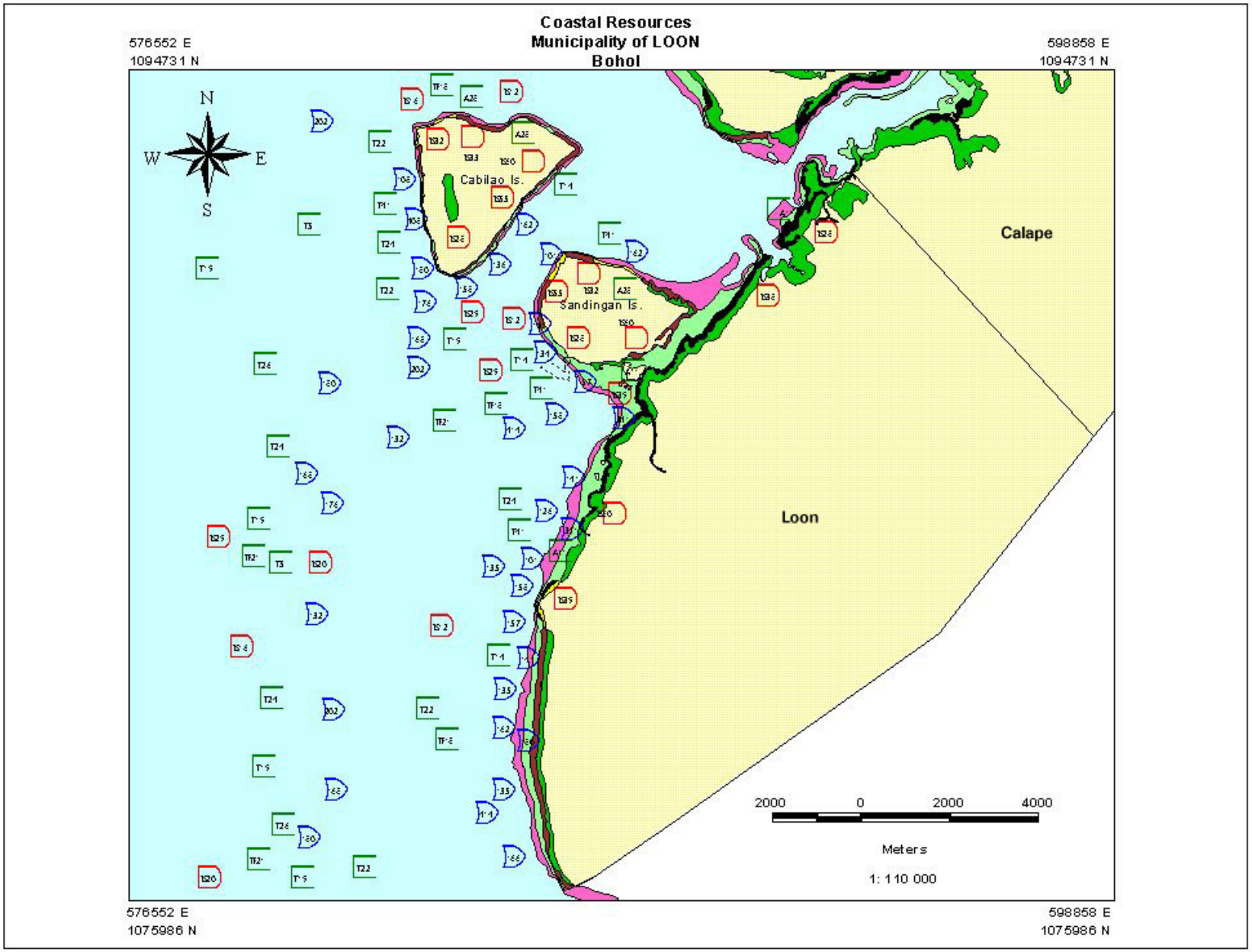


Figure 3.2. Coastal resource map of Loon, Bohol.

LOON

Legend:

Municipal boundary

Fish sanctuary

HABITATS

- Sandy Beach
- Rocky Shoreline
- Inshore Flats
- Seagrass Beds
- Coral Reef
- Estuary
- Mangrove
- Terrestrial Zone
- Marine Zone
- Mudflats
- Offshore sandbars

RESOURCES

- 101 Anchovies
- 108 Batfish
- 126 Emperor breams
- 132 Flying fish
- 134 Fusiliers
- 135 Garfish, needlefish
- 136 Goatfish
- 141 Halfbeaks
- 157 Mullets
- 158 Parrotfish
- 162 Rabbitfish, spinefeet
- 166 Sardines and herrings
- 169 Scads
- 176 Sharks
- 180 Slipmouths
- 202 Tunas and mackerels
- 341 Venus shells
- 408 Octopuses
- 414 Squids

USES

- A11 Fishponds/shrimp ponds
- A28 Protected areas
- IF18 Gears banned by local legislation (e.g. beach seines, baby trawls, modified danish seines)
- IF21 Superlights within municipal waters
- T5 Bottom set gill nets
- T14 Drive-in nets
- T19 Fish shelters
- T22 Hook and lines/handlines/droplines
- T24 Jiggers
- T28 Lights
- T41 Spears

ISSUES

- IS12 Destructive fishing
- IS16 Encroachment on the fishing ground by outsiders
- IS20 Fishing gear conflicts
- IS28 Lack of alternative livelihood
- IS29 Lack of law enforcement
- IS32 Lack of security of tenure of land and/or home lot
- IS33 Lack of social services
- IS38 Mangrove conversion
- IS39 Mangrove overharvesting
- IS55 Waste dumping
- IS60 Gambling

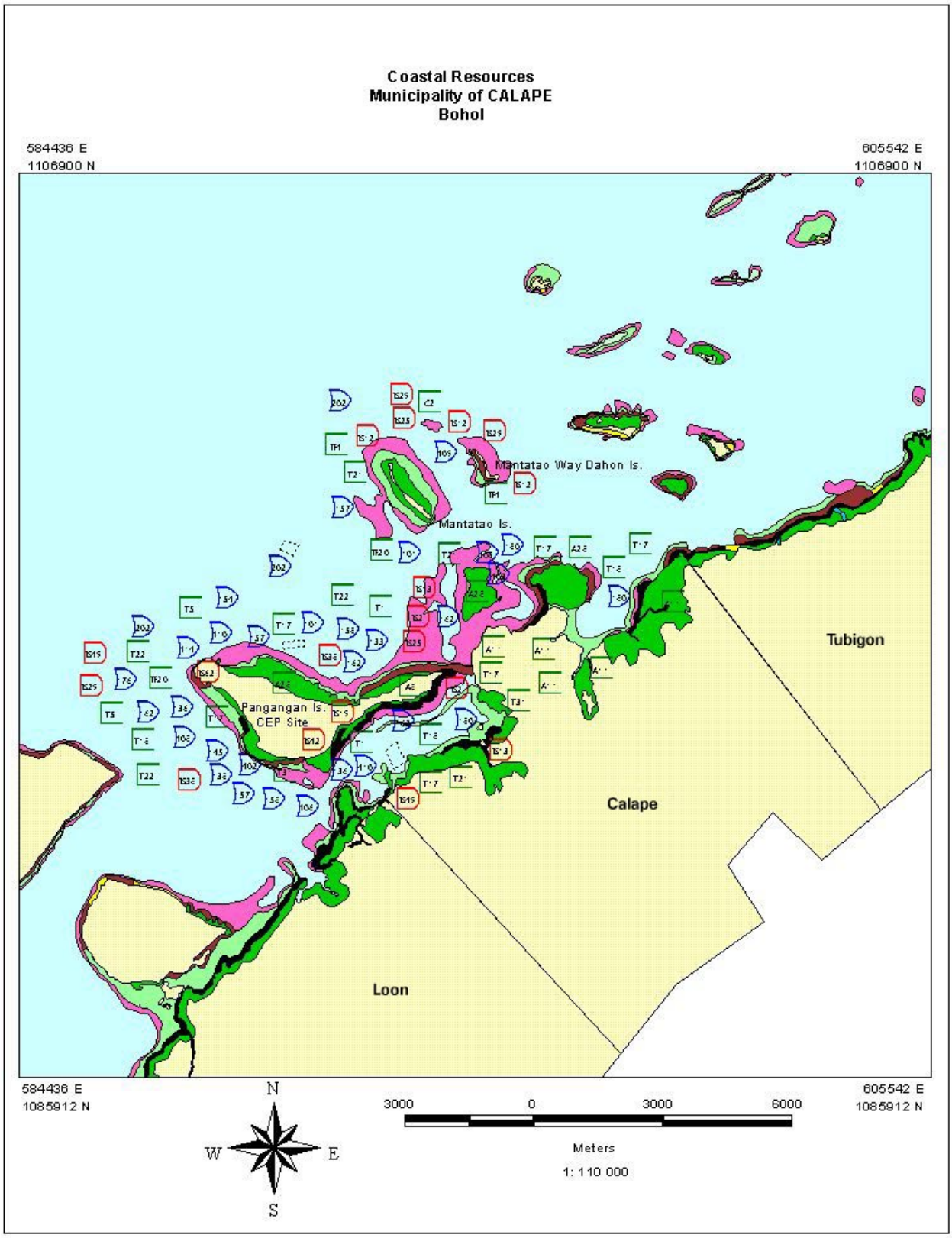


Figure 3.3. Coastal resource map of Calape, Bohol.

CALAPE

Legend:

Municipal boundary

Fish sanctuary

CEP — Coastal Environment Program

HABITATS

- Sandy Beach
- Rocky Shoreline
- Inshore Flats
- Seagrass Beds
- Coral Reef
- Estuary
- Mangrove
- Terrestrial Zone
- Marine Zone
- Mudflats
- Offshore sandbars

RESOURCES

- 101 — Anchovies
- 133 — Fork-tailed catfish
- 136 — Goatfish
- 138 — Groupers, seabasses, perchlets
- 145 — Jacks and cavallas
- 154 — Moorish idols
- 157 — Mullets
- 158 — Parrotfish
- 162 — Rabbitfish, spinefeet
- 176 — Sharks
- 180 — Slipmouths
- 202 — Tunas and mackerels
- 402 — Cuttlefish
- 403 — Large shrimps and prawns
- 406 — Blue crabs
- 409 — Octopuses
- 409 — Sea cucumbers
- 410 — Sea urchins
- 414 — Squids

USES

- A8 — Fish cages
- A11 — Fishponds/shrimp ponds
- A28 — Protected areas
- C2 — Compressors
- IF4 — Explosives
- IF20 — Poisons/noxious substances
- T1 — Bagnets
- T5 — Bottom set gill nets
- T17 — Fish corrals
- T18 — Fish pots and crab pots
- T21 — Harpoons
- T22 — Hook and lines/handlines/droplines
- T31 — Push nets

ISSUES

- IS2 — Beach/shoreline erosion
- IS12 — Destructive fishing
- IS13 — Deterioration of aesthetic quality
- IS19 — Fish kills
- IS25 — Illegal fishing
- IS29 — Lack of law enforcement
- IS38 — Mangrove conversion
- IS42 — Overfishing
- IS49 — Siltation
- IS62 — Sand extraction

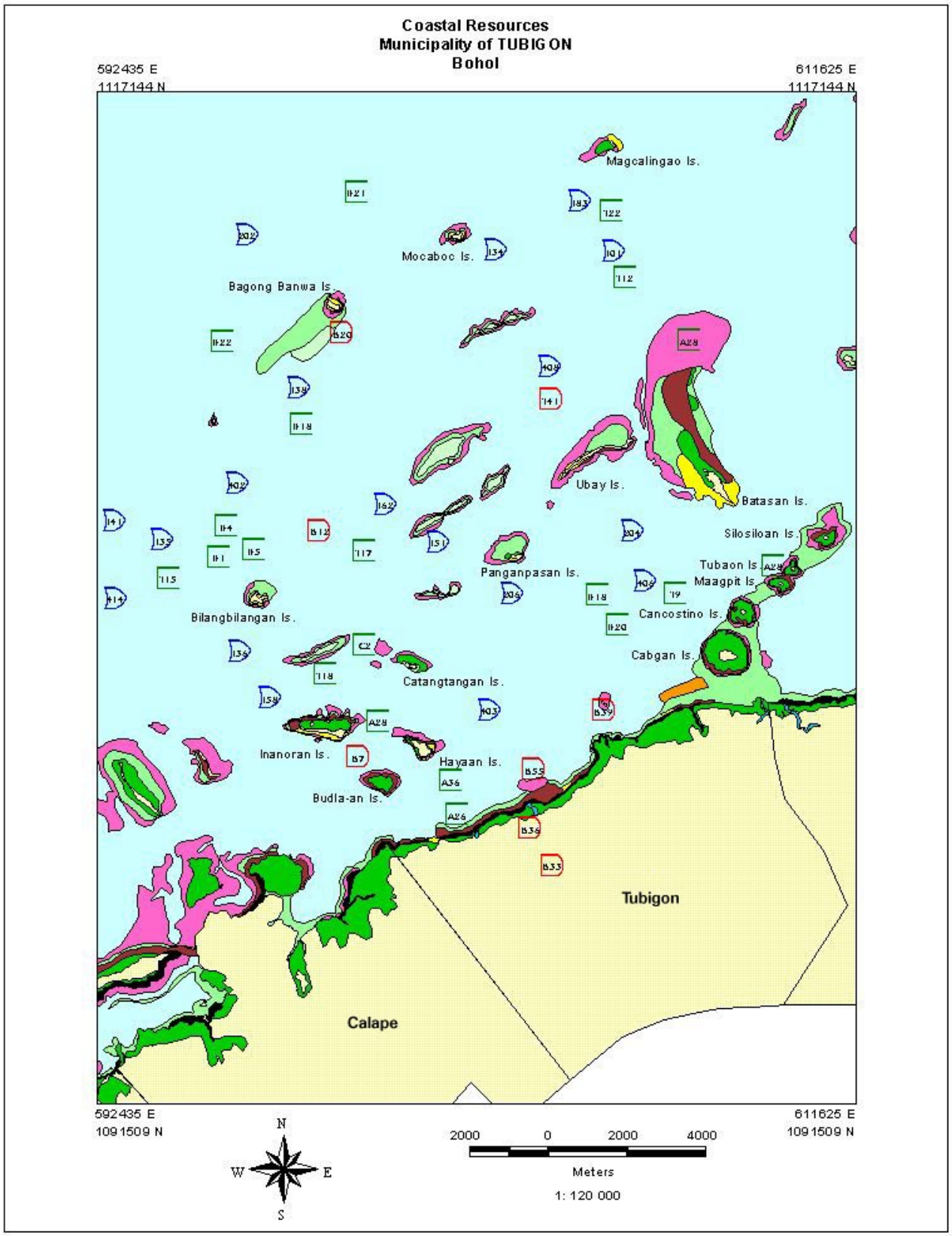


Figure 3.4. Coastal resource map of Tubigon, Bohol.


TUBIGON
Legend:
Municipal boundary
HABITATS
Sandy Beach
Rocky Shoreline
Inshore Flats
Seagrass Beds
Coral Reef
Estuary
Mangrove
Terrestrial Zone
Marine Zone
Mudflats
Offshore sandbars
RESOURCES
101 Anchovies
104 Fusiliers
105 Garfish, needlefish
106 Goatfish
108 Groupers, seabasses, perchlets
111 Halfbeaks
115 Jacks and cavallas
121 Mojarras
128 Parrotfish
132 Rabbitfish, spinefeet
133 Snappers
202 Tunas and mackerels
204 Whitings
206 Wrasses
402 Cuttlefish
403 Large shrimps and prawns
406 Blue crabs
408 Octopuses
414 Squids
USES
A26 Port/pier/wharf/marina
A28 Protected areas
A36 Sand and gravel extraction
C2 Compressors
IF1 Drive-in net with bamboo/tree trunk scare devices
IF4 Explosives
IF5 Fine mesh nets (<3cm) for unexempted species
IF18 Gears banned by local legislation (e.g. beach seines, baby trawls, modified danish seines)
IF20 Poisons/noxious substances
IF21 Superlights within municipal waters
IF22 Commercial fishing
T9 Crab lift nets
T12 Drift gill nets
T15 Encircling gill nets
T17 Fish corrals
T18 Fish pots and crab pots
T22 Hook and lines/handlines/droplines
T41 Spears
ISSUES
IS7 Coral extraction
IS9 Declining fish catch
IS12 Destructive fishing
IS20 Fishing gear conflicts
IS36 Low environmental awareness
IS39 Mangrove overharvesting
IS55 Waste dumping

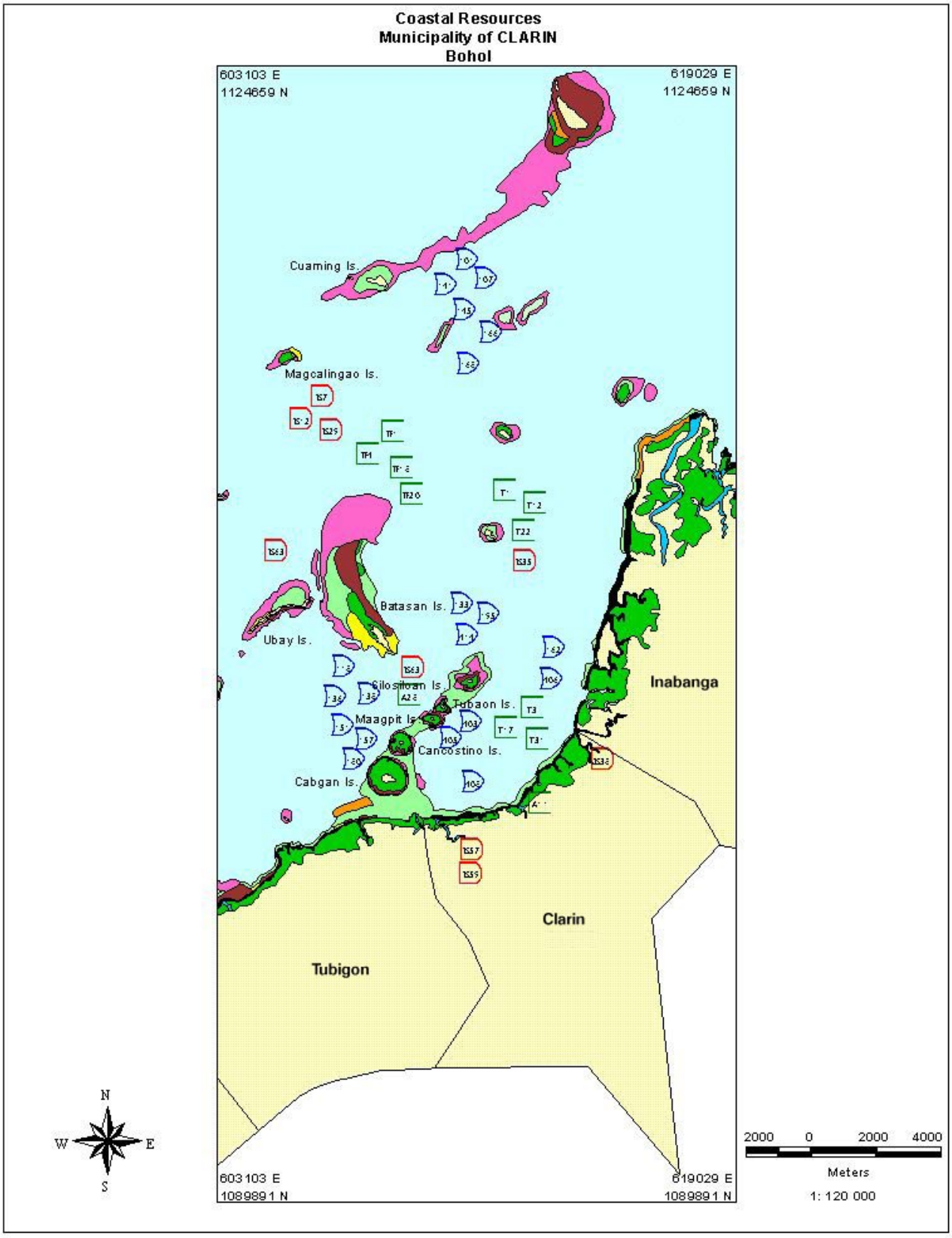


Figure 3.5. Coastal resource map of Clarin, Bohol.


CLARIN
Legend:
Municipal boundary
HABITATS
Sandy Beach
Rocky Shoreline
Inshore Flats
Seagrass Beds
Coral Reef
Estuary
Mangrove
Terrestrial Zone
Marine Zone
Mudflats
Offshore sandbars
RESOURCES
101 Anchovies
107 Barracudas
118 Croakers
133 Fork-tailed catfish
136 Goatfish
138 Groupers, seabasses, perchlets
141 Halfbeaks
145 Jacks and cavallas
151 Mojarras
157 Mullets
162 Rabbitfish, spinefeet
166 Sardines and herrings
169 Scads
180 Slipmouths
195 Threadfin breams
403 Large shrimps and prawns
405 Mud/mangrove crabs
406 Blue crabs
408 Octopuses
414 Squids
USES
A11 Fishponds/shrimp ponds
A28 Protected areas
IF1 Drive-in net with bamboo/tree trunk and scare devices
IF4 Explosives
IF18 Gears banned by local legislation (e.g. beach seines, baby trawls, modified danish seines)
IF20 Poisons/noxious substances
T1 Bagnets
T3 Beach seines
T12 Drift gill nets
T17 Fish corrals
T22 Hook and lines/handlines/droplines
T31 Push nets
ISSUES
IS7 Coral extraction
IS12 Destructive fishing
IS29 Lack of law enforcement
IS35 Loss of rare/endangered species
IS38 Mangrove conversion
IS57 Weak organization
IS59 Lack of funding for CRM
IS60 Boundary dispute

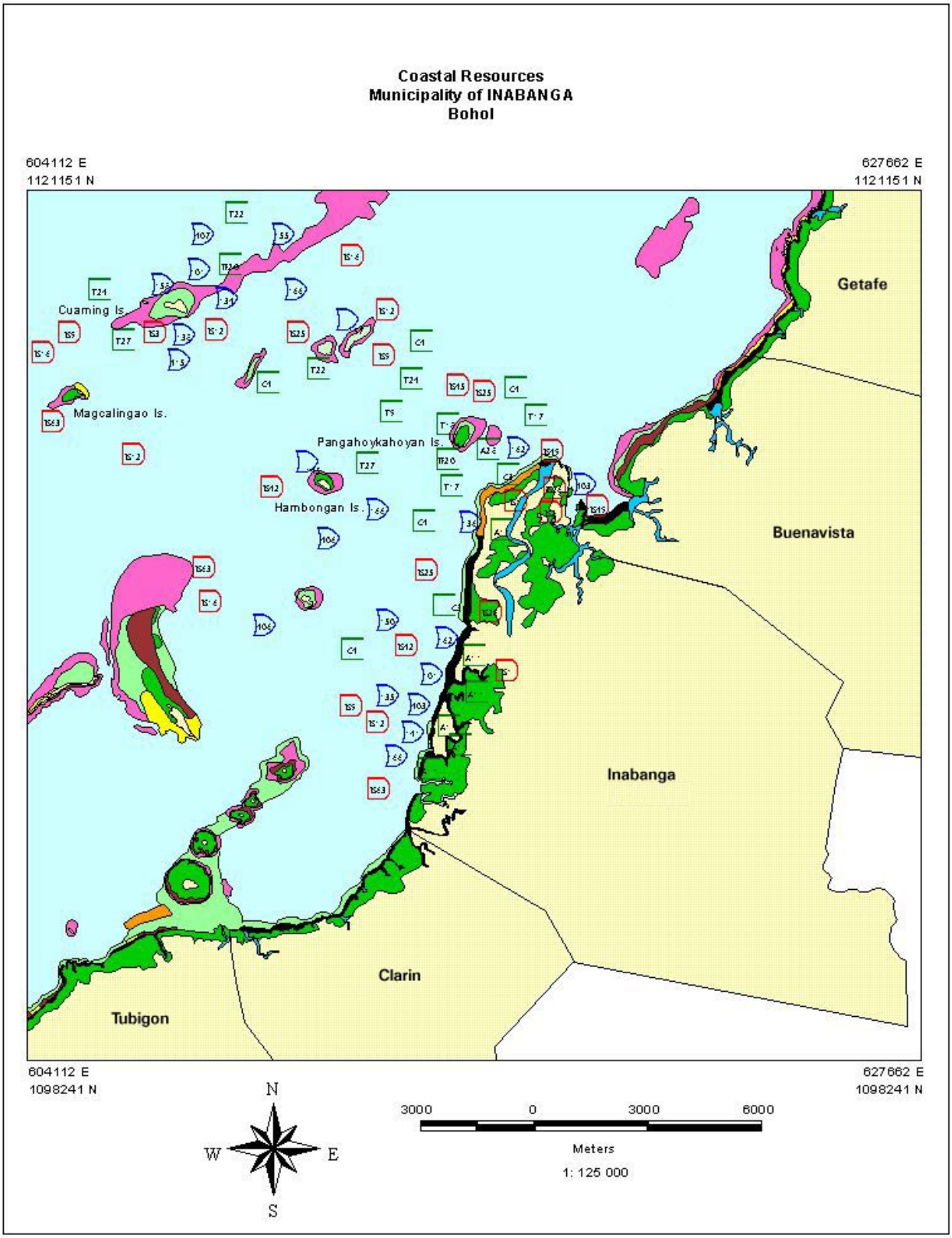


Figure 3.6. Coastal resource map of Inabanga, Bohol.

INABANGA

Legend:

Municipal boundary

HABITATS

- Sandy Beach
- Rocky Shoreline
- Inshore Flats
- Seagrass Beds
- Coral Reef
- Estuary
- Mangrove
- Terrestrial Zone
- Marine Zone
- Mudflats
- Offshore sandbars

RESOURCES

- 101 Anchovies
- 134 Fusiliers
- 135 Garfish, needlefish
- 136 Goatfish
- 138 Groupers, seabasses, perchlets
- 141 Halfbeaks
- 145 Jacks and cavallas
- 150 Milkfish
- 155 Moray eels
- 157 Mullets
- 158 Parrotfish
- 162 Rabbitfish, spinefeet
- 166 Sardines and herrings
- 403 Large shrimps and prawns
- 406 Blue crabs
- 407 Nautilus
- 415 Giant red squids

USES

- A11 Fishponds/shrimp ponds
- A28 Protected areas
- C3 Drive-in nets with various scaring devices
- C4 Modified danish seines
- IF20 Poisons/noxious substances
- T9 Crab lift nets
- T17 Fish corrals
- T18 Fish pots and crab pots
- T22 Hook and lines/handlines/droplines
- T24 Jiggers
- T27 Multiple hook and lines

ISSUES

- IS1 Abandoned/unproductive fishponds
- IS2 Beach/shoreline erosion
- IS3 Breakage of corals
- IS9 Declining fish catch
- IS12 Destructive fishing
- IS16 Encroachment on the fishing ground by outsiders
- IS25 Illegal fishing
- IS26 Illegal fishponds
- IS42 Overfishing
- IS45 Reclamation
- IS49 Siltation
- IS60 Boundary dispute

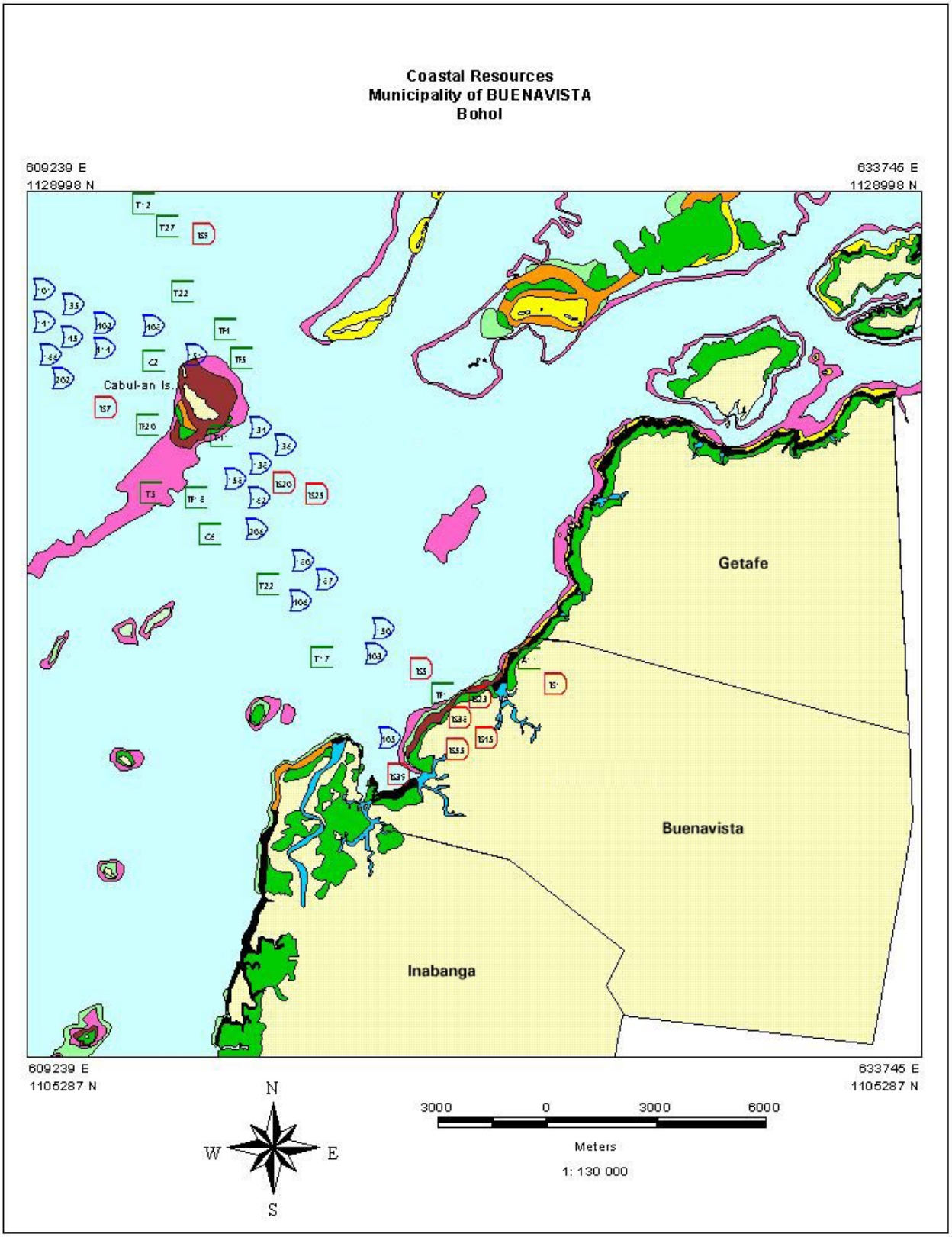


Figure 3.7. Coastal resource map of Buenavista, Bohol.

BUENAVISTA

Legend:

Municipal boundary

HABITATS

- Sandy Beach
- Rocky Shoreline
- Inshore Flats
- Seagrass Beds
- Coral Reef
- Estuary
- Mangrove
- Terrestrial Zone
- Marine Zone
- Mudflats
- Offshore sandbars

RESOURCES

- 101 Anchovies
- 134 Fusiliers
- 135 Garfish, needlefish
- 136 Goatfish
- 138 Groupers, seabasses, perchlets
- 141 Halfbeaks
- 145 Jacks and cavallas
- 150 Milkfish
- 151 Mojarras
- 158 Parrotfish
- 162 Rabbitfish, spinefeet
- 166 Sardines and herrings
- 180 Slipmouths
- 187 Stingrays
- 202 Tunas and mackerels
- 206 Wrasses
- 402 Cuttlefish
- 403 Large shrimps and prawns
- 405 Mud/mangrove crabs
- 406 Blue crabs
- 408 Octopuses
- 414 Squids

USES

- A11 Fishponds/shrimp ponds
- C2 Compressor
- C8 Trawls
- IF1 Drive-in net with bamboo/tree trunk and scare devices
- IF4 Explosives
- IF5 Fine mesh nets (<3cm) for unexempted species
- IF18 Gears banned by local legislation (e.g. beach seines, baby trawls, modified danish seines)
- IF20 Poisons/noxious substances
- T5 Bottom set gill nets
- T12 Drift gill nets
- T17 Fish corrals
- T22 Hook and lines/handlines/droplines
- T27 Multiple hook and lines
- T41 Spears

ISSUES

- IS1 Abandoned/unproductive fishponds
- IS5 Coliform pollution
- IS7 Coral extraction
- IS9 Declining fish catch
- IS20 Fishing gear conflicts
- IS23 High cost of fishing inputs
- IS25 Illegal fishing
- IS38 Mangrove conversion
- IS39 Mangrove overharvesting
- IS45 Reclamation
- IS55 Waste dumping

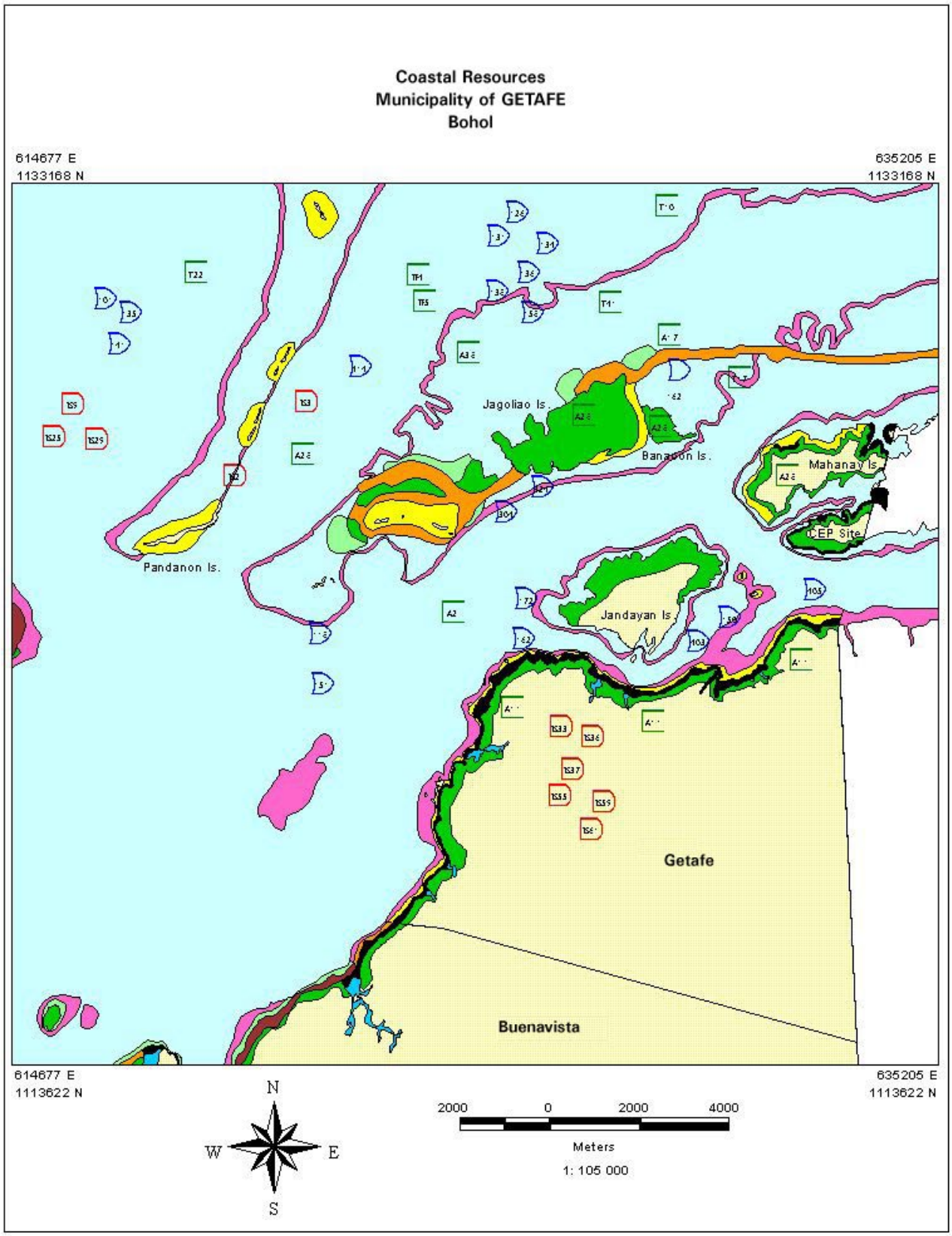
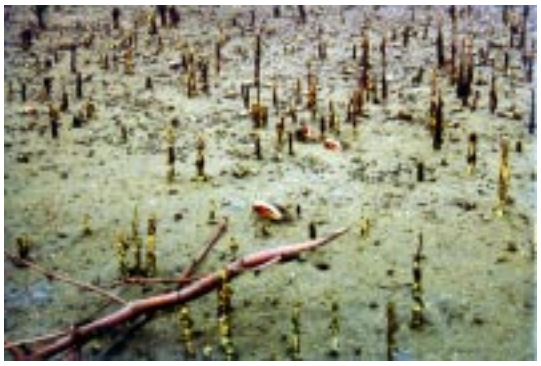


Figure 3.8. Coastal resource map of Getafe, Bohol.


GETAFE
Legend:
Municipal boundary
CEP
Coastal Environment Program
HABITATS
Sandy Beach
Rocky Shoreline
Inshore Flats
Seagrass Beds
Coral Reef
Estuary
Mangrove
Terrestrial Zone
Marine Zone
Mudflats
Offshore sandbars
RESOURCES
101 Anchovies
118 Croakers
126 Emperor breams
131 Flatheads
134 Fusiliers
135 Garfish, needlefish
136 Goatfish
138 Groupers, seabasses, perchlets
141 Halfbeaks
150 Milkfish
151 Mojarras
158 Parrotfish
162 Rabbitfish, spinefeet
172 Seahorses
304 Bubble shells
324 Miter shells
403 Large shrimps and prawns
405 Mud/mangrove crabs
414 Squids
USES
A2 Anchorage
A11 Fishponds/shrimp ponds
A17 Mangrove plantations
A28 Protected areas
A38 Seaweed culture
IF4 Explosives
IF5 Fine mesh nets (<3cm) for unexempted species
T10 Dip nets
T17 Fish corrals
T22 Hook and lines/handlines/droplines
T41 Spears
ISSUES
IS2 Beach/shoreline erosion
IS3 Breakage of corals
IS9 Declining fish catch
IS25 Illegal fishing
IS29 Lack of law enforcement
IS33 Lack of social services
IS36 Low environmental awareness
IS37 Low prices of fishery products
IS55 Waste dumping
IS59 Lack of funding for CRM activities
IS61 Rapid population growth

Confiscated illegal fishing gear on show at the "Saulog sa Dagat" *or Festival of the Sea.*



Fiddler crabs in a mangrove area... each small organism contributes to the high productivity of mangrove areas.

Planning for management with coastal community members. (Photo by Calixto Yao)

CRMP enterprise development specialist, discusses the pros and cons of Eucheuma *farming.*

An island community mapping their resources through a participatory coastal resource activity.

Fisherfolk of Cabilao Island, conducting regular community-based monitoring along fixed transect in Cabacongan, Cabilao, Loon, Bohol.

Starting them young... schoolchildren planting mangroves. - Inabanga. (Photo by Calixto Yao)

Squid jigger in Buenavista. An average catch of 2-3 kg per night is considered lucky nowadays.

Typical sailboats, Inabanga

Nipa palms are economically important in Bohol but the demand for nipa thatch as roofing material has declined in recent years.

Governor Rene Relampagos (with mangrove bonsai) and Vice-Governor Edgar Chatto at the CRMP booth during the Saulog sa Dagat *Celebration in Buenavista.*

By-catch from a beach seine. This fishing gear scrapes the bottom of the sea and destroys the very habitat upon which fishes and other organisms depend.

Collecting tihi-tihi *(sea urchin roe). After crushing the sea urchins (*tuyom, sawaki*), the roe is scraped, placed inside empty rum bottles (*lapad*), and sold at P30-50 per* lapad.

All other photographs on this spread by Stuart J. Green

SUMMARY

Deposits of copper, manganese, silica and phosphate have been reported as present in the northwestern municipalities of Bohol. Mining and quarrying, however, have been concentrated on limestone and river sand for construction purposes. The collection of sand especially from small islands has created a controversy with the reported disappearance of some islands off Tubigon and Clarin. Meanwhile, the municipalities have no major forest resources except mangrove areas some of which are classified as "protection forests".

The coastline of northwestern Bohol has many of the coastal resources and ecosystems typical to the Philippines. Mangroves, for example, stabilize coastal erosion, filter the water that flows towards the sea, serve as breeding ground for various fish species, and provide a habitat for economically important organisms such as shellfishes and crustaceans. The nearshore areas are mainly seagrass and algal beds while the open waters have a high population of zooplankton. Good coral growth has been observed on reef slopes but there is no excellent live hard coral (LHC). More than 100 species of fish, mostly reef-associated, have been recorded. This is low by Philippine standards and can be attributed to the intense fishing effort on most reefs regardless of coral cover. Most of the fish are undersize, also indicating severe overfishing in the area.

Chapter 4
SOCIOPOLITICAL SETTING

POLITICAL BOUNDARIES

The profile area is bounded by 6 municipalities. To the south is Maribojoc, while Antequera, San Isidro, Sagbayan and Danao border the East. The northern edge of the profile area is bounded by the municipality of Talibon.

DEMOGRAPHICS

Population

Seven municipalities comprise the profile area. Their total population in 1995 was 197,463 distributed to 38,138 households. The average household size was 5.3 persons (NSO 1995).

The average annual rate of provincial population growth is estimated at 1.86 percent over the 1990-2002 period (PPDO 1993b). There is a high level of out-migration as people search for "greener pastures" abroad and in the cities of Cebu, Manila and Davao. (Bohol has over 30,000 people working abroad.) This growth rate is one of the lowest in the Central Visayas region, which is currently experiencing a regional annual growth rate of 2.17 percent. The profile area's population annual growth rate is estimated at a slightly lower 1.75 percent. Getafe and Buenavista, both highly rural, are projected to grow relatively rapidly at rates exceeding 2 percent (Table 4.1).

As mentioned earlier, population pressure in the future will impact upon land-use sustainability. For example, 5 of the fastest-growing municipalities in Bohol are coastal, and 5 of the 6 central business districts are located within coastal municipalities (PPDO 1997). Current population levels are not seen as adversely affecting sustainability,

Table 4.1. Population by municipality and growth (PPDO 1993b; NSO 1995).

Municipality	Population	No. of households	% Annual growth
Buenavista	24,215	4,240	2.04
Calape	26,051	5,097	1.07
Clarin	15,961	3,217	1.78
Inabanga	40,015	7,561	1.48
Getafe	23,927	4,179	2.56
Tubigon	34,578	6,770	1.55
Loon	32,716	7,074	-0.94
Profile area	**197,463**	**38,138**	**1.36**
Bohol Province	1,159,680	218,807	1.86

but that may change as the need for food and living space (including sanitation space) increases over time. The implications of urban and rural population pressure will be discussed in the following sections.

There are 121 coastal and island barangays (Table 4.2) with a combined population of 106,307 inhabitants along the coastline of the profile area (PPDO 1992; NSO 1995). Forty of these are island barangays populated by 30,790 inhabitants. The remaining 81 barangays are located along the coastline of the Bohol mainland and are populated by 75,517 inhabitants. The municipality of Loon has the most coastal (18) and island (13) barangays, but it does not have as many fishing households as other municipalities such as Calape, Tubigon and Inabanga. In fact, the fishing households of Loon's 13 island barangays comprise a relatively low percentage of the total island population. This situation is explained by the townsfolk's tendency to migrate to other parts of the country, particularly Eastern Visayas, Mindanao and Metro Manila for employment or business. NSO (1995) records show that among the municipalities in the profile area only Loon has a negative population growth rate (-0.94 percent) (Table 4.1). It also has the lowest population density (Table 4.4).

Buenavista has 8 coastal barangays (population: 5,609) and 2 island barangays (population: 3,151). Calape has 8 coastal barangays (population: 9,064) and 9 island barangays (population: 4,213), 8 of which are on Pangangan Island. Clarin has only 7 coastal barangays (population: 6,510), while Inabanga has 17 (population: 14,241) and 2 island barangays (population: 2,361). Getafe has 11 coastal barangays (population: 9,476) and 8 island barangays (population: 8,516). Tubigon has 12 coastal barangays (population: 17,036) and 6 island barangays (population: 3,128). Loon has 18 coastal barangays (population: 13,581) and 13 island barangays (population: 9,421) (PPDO 1992).

Seventy-six percent of the coastal inhabitants were born in the profile area. In most cases, they continued to live in their birthplace. The other 24 percent were born outside the area, but generally in the province.

Table 4.2. Coastal and island barangays in the profile area (PPDO 1992, 1998; NSO 1995).

Municipality	Coastal barangays		Island barangays	
Loon	Song-on	Basac	Basdio	Looc
	Tontonan	Biasong	Canigaan	Cabacongan
	Cuasi	Canhangdon Occidental	Ubujan	Talisay
	Tangnan	Ubayon	Sondol	Pantudlan
	Pig-ot	Catagbacan Sur	Mocpoc Sur	Cambaquiz
	Basdacu	Catagbacan Norte	Mocpoc Norte	
	Lintuan	Catagbacan Handig	Calayugan Sur	
	Napo	Cantumocad	Calayugan Norte	
	Cogon Norte	Pondol		
Calape	Liboron	Tultugan	Mantatao	Talisay
	Desamparados	Santa Cruz	Lomboy	Lawis
	Bentig	San Isidro	Magtongtong	Kahayag
	Abucayan Norte	Abucayan Sur	Looc	Kinabag-an
			Madangog	
Tubigon	Matabao	Guiwanon	Batasan	
	Tinangnan	Pandan	Bilangbilangan	
	Potohan	Cabulihan	Ubay	
	Panaytayon	Pooc Oriental	Mocaboc	
	Macaas	Pooc Occidental	Pangapasan	
	Centro	Pinayagan Norte	Bagongbanwa	
Clarin	Buacao	Tangaran		
	Lajog	Bacani		
	Bonbon	Nahawan		
	Poblacion Norte			
Inabanga	Ubujan	Lutao	Hambongan	
	Tungod	Bugang	Cuaming	
	Saa	U-og		
	Cogon	Ondol		
	San Isidro	Sto. Rosario		
	Poblacion	Lawis		
	Fatima	Cagawasan		
	Ilaud	Sto. Niño		
	Daet Sur			
Buenavista	Cambuhat	Cruz	Western Cabul-an	
	Sweetland	Poblacion	Eastern Cabul-an	
	Asinan	Cangawa		
	Hunan	Bato		
Getafe	Saguisi	Campao Oriental	Pandanon	Handumon
	Salog	Campao Occidental	Nasingin	Jagoliao
	Poblacion	Carlos P. Garcia	Banacon	
	San Jose	Corte Baud	Jandayan Norte	
	Taytay	Tulang	Jandayan Sur	
	Tugas		Alumar	
Profile area (121)	**81**		**40**	

In comparison with the province of Bohol as a whole, the entire profile area is more rural in population distribution, and has a higher population density per km^2 of land (see Tables 4.3 and 4.4).

Typical of Philippine coastal municipalities, the urban areas of the profile area are located along the coast. Development is concentrated in and around these urban clusters,

Table 4.3. Distribution between urban and rural populations (PPDO 1993b).

Municipality	% Urban	% Rural
Buenavista	2.70	97.30
Calape	7.66	92.34
Clarin	16.47	83.53
Inabanga	4.41	95.59
Getafe	7.37	92.63
Tubigon	14.88	85.12
Loon	25.90	74.10
Province	16.29	83.71
Profile area	**11.34**	**88.66**

Table 4.4. Population density in the profile area (persons/km^2) (PPDO 1993b).

Municipality	Density
Buenavista	309
Calape	365
Clarin	310
Inabanga	335
Getafe	277
Tubigon	539
Loon	272
Province	282
Profile area average	**344**

following a linear pattern of growth along the coastline. This means that urban areas are going to encroach upon mangrove and marsh lands at an approximate rate of 1.75 percent per year. Consequently, agricultural lands will have to be increased annually by as much as 3 percent in the area to meet local consumption demands (AusAID 1995).

In addition, each municipal urban center should have at least 8,000 m^2 of landfill/ dumpsites. By the year 2005, these same urban centers will each require about 11,000 m^2 of landfill. At present, there is only one such site, located in Calape, in the profile area. This means that a large amount of land will have to be claimed just to meet the minimum sanitary requirements. This future land conversion will cut into agricultural and housing usage that is necessary to meet the increased needs of more and more inhabitants.

The high population density of the area (relative to the rest of the province) implies that land-use sustainability in the profile area may drop at a much faster rate than in the rest of the province. This could result in a higher rate of environmental degradation, with a resulting drop in land (and coastal zone) productivity.

The municipality that potentially will suffer the most pressure and degradation is Tubigon. Not only is Tubigon highly urban, but it also has the highest population

density in the profile area (and the province). With its intended urban expansion and industrial area/port development, Tubigon will definitely encroach upon delicate mangrove and marsh systems as its population increases. Waste and pollution run off from the urban center will increase, which will add to effluents from the industrial area and ship discharge. This will seriously degrade the surrounding environment.

Religious and Ethnic Groups

Approximately 90 percent of the population in the profile area are Roman Catholic, with the remaining 10 percent scattered among the following denominations: Philippine Independent Catholic Church (Aglipayan), *Iglesia ni Kristo*, United Church of Christ of the Philippines, Jehovah's Witnesses, and Seventh Day Adventist Church (PPDO 1993b). Cebuano is the predominant language with each municipality, or even barangay, having certain modifications in speaking tone and pronunciation.

Labor and Employment

Within the province, over one-third of the 1990 working population was employed in the agriculture sector, which includes fisheries and forestry (PPDO 1993b). The provincial employment rate is approximately 95.6 percent, with a working age population of 15 years and above. Of the working age population, approximately 61.8 percent participate in the labor force.

The overall annual projected employment growth rate for the period 1990-2002 is estimated at 5.26 percent (PPDO 1993b), which is among the highest in Central Visayas. The annual regional employment growth is projected at only 2.5 percent. There is a growing trend of people moving into the manufacturing and service sectors as agriculture and related fields are not known for generating much personal income. This may result in fewer small family plots, and the emergence of larger, more commercial ventures.

The tertiary sector (manufacturing, construction, transportation, etc.) is projected to grow annually at a rate of 6.6 percent over the next 5 years. Mining and quarrying are expected to be the highest growth sub-sectors. This increase is worrisome from an environmental impact point of view. Since many mining and quarrying ventures do not adhere to DENR guidelines, this growth may lead to increased soil erosion, destruction due to excavation and nearshore water pollution.

Half of the people interviewed in the coastal communities in the profile area engage in fishing, with an average income of PhP 1,830 per month (Table 4.5). Ten percent are involved in fisheries-related occupations (PhP 3,269 per month), and another 10 percent are involved in commercial businesses (PhP 4,096 per month).

Table 4.5. Livelihood and income profile of coastal inhabitants (PPDO 1993b; SUML 1997).

Livelihood	Population distribution (%)	Monthly average (pesos)	Annual income (pesos)
Fishing	50.00	1,830	21,876
Fisheries-related	9.77	3,269	38,261
Business	9.77	4,096	49,153
Fishing and non-fisheries related	6.90	3,829	45,026
Skilled labor	6.32	2,800	32,545
Unskilled labor	6.03	1,098	12,994
Salary	3.16	360	4,000
Farming	2.87	604	4,063

US$1 = PhP 26.50 in 1997.

Only about 3 percent of the coastal inhabitants are actively involved in farming activities of any kind. The average monthly income of farmers is PhP 604, which is one of the lowest incomes reported in the profile area. Approximately 10 percent of the coastal inhabitants engage in fisheries-related activities to supplement their primary incomes.

All in all, over 60 percent of the coastal inhabitants live below the poverty line of PhP 6,000 per month for a family of 5-6 members. Unfortunately, fisherfolk (and farmers), who provide the market with fresh food, make up the bulk of this group. As in other areas of the country, the middlemen who barter foodstuffs are among the highest-earning income groups. One popular argument for the low income of fisherfolk and farmers is that they typically have weak collective organizational structures. Instead of bartering for profit with the market through a unified cooperative or association, each individual usually attempts to strike some sort of deal, and ends up selling at cost. High levels of debt and the *"suki"* relationship with fish buying and selling keeps the "gate price" of fish down to the benefit of the middlemen. Nevertheless, this "*suki*" system allows the seller to borrow money and purchase fishing equipment.

Table 4.6. Monthly income distribution of full-time fisherfolk.

Income (pesos)	Profile area (% population)	Bohol (% population)
< 1,000	35	28
1,001 - 2,000	33	35
2,001 - 3,000	23	24
3,001 - 4,000	7	8
4,001 - 5,000	1.77	3
> 5,001	0.23	2

US$1 = PhP 26.50 in 1997

Compared to the fisherfolk in the rest of the province, those in the profile area earn relatively the same level of income, with some minor variations (due to averaging). Only about 10 percent of the fisherfolk in the profile area live above the poverty line (Table 4.6).

Ninety-five percent of the coastal inhabitants in the area do not own agricultural land, but 61 percent do own residential land (SUML 1997). Reportedly, 88 percent of the houses are owned by their residents. The majority of the houses in the coastal communities (70 percent) are made of light materials (non-permanent) such as *nipa*, *kawayan* (bamboo) and coconut lumber. Approximately 20 percent of the coastal inhabitants are essentially squatters, living on government/public land, i.e., 20 m from the high-tide level landward. The illegal encroachment by squatters is bound to increase dramatically as population pressure continues to soar in the near future and no provision for housing is forthcoming.

The majority of coastal inhabitants own livestock and poultry, the most common of which are hogs, native chickens and fighting cocks. Most of these animals are raised for household consumption and especially fighting cocks for entertainment particularly during fiestas or religious holidays.

Another approach to examining social classification is to observe the possession of furniture and appliances. More than 60 percent of the coastal residents do not own furniture; and only 50 percent own radios (SUML 1997), from which most of them derive information and entertainment. This relatively low level of radio ownership is probably due to the fact that only about 50 percent of the profile area is connected to electric power (Table 4.7). However, this is comparable to the province, since only 53 percent of households in Bohol have electricity.

Table 4.7. Level of municipal electrical connections (PPDO 1993b).

Municipality	% of households
Buenavista	20.39
Calape	74.66
Clarin	66.39
Getafe	20.40
Inabanga	41.76
Tubigon	78.87
Loon	50.03
Profile area	**50.35**
Province	52.95

In keeping with its highly urban nature, Tubigon has the highest electrical connection rate in the area (and third highest in the province, behind Jagna and

Tagbilaran City). This indicates a higher infrastructure potential for Tubigon as a provincial growth area, which is backed up by the port expansion and industrial development.

Public Assistance Programs

Under Republic Act 8550 (the Philippine Fisheries Code of 1998), municipalities may seek financial assistance for fishery projects from the DA's Municipal Fisheries Grant Fund. This Php 100-million grant is aimed at easing the economic burdens of municipal fisherfolk. Another DA Fishery Loan and Guarantee Fund of PhP 100 million is also available under administration by the Land Bank of the Philippines. This fund will be made available to qualified borrowers in the near future; however, this funding program is commonly seen as only benefiting commercial operators. An Aquaculture Investment Fund is also mandated by the Philippine Fisheries Code for the purpose of extending soft loans to municipal fisherfolk organizations. The loans will be for aquaculture projects, and for the upgrade of inland fishponds.

Land Bank itself may give loans to fisherfolk for the purchase of fishing gears and related equipment. However, the bank typically does not extend these loans due to the lack of collateral on the part of the fisherfolk. Even the existence of fishing associations is not enough to generate a loan, because the bank claims that most of the associations are poorly managed. The bank does not want to take responsibility for unguaranteed loans that are almost sure to be defaulted. On the positive side, Land Bank does offer technical and consultative services as part of the loan to qualified cooperatives and associations. Its loans, however, tend to be very large and ambitious and have no thrust towards resource management, but solely for production purposes.

The national Poverty Alleviation Fund also allows the municipalities to present proposals for funding. The majority of the approved projects are related to child and maternal care, potable water supply, and alternative livelihoods for lower-income families.

In addition, there is the Presidential Commission for Countryside Development (PCCD) which sponsors rural-based alternative livelihood projects. The Minimum Basic Needs/Social Reform Agenda also seeks to meet the primary needs of food, shelter and clothing of low-income families. The Department of Social Welfare and Development (DSWD) and the PPDO are responsible at the provincial level for implementing these various projects. Calape Bay is one of the SRA sites in the province. DSWD also has its own activities aimed at uplifting women’s groups and children. Loans are generally available through the Land Bank for the development of small enterprises. These enterprises are usually *sari-sari* stores and *traysikads* (pedicabs).

The National Food Authority (NFA) typically has some funding for small-scale rice millers. The farmers do not actually benefit from these programs, only the processors and middlemen.

The Department of Agriculture's **Livelihood Enhancement and Development (LEAD)** program gives out loans to fisherfolk organizations for the purchase of fishing gears, boats and engines. This encourages more fishing effort and is only a short-term production-based solution, as opposed to offering sustainable management mechanisms tied to non-fishing livelihoods.

HEALTH, SANITATION AND MEDICAL CARE

There are several community hospitals in the profile area. A 10-bed municipal hospital is located in Cagayan, Inabanga, while a 15-bed hospital is located in Poblacion, Clarin. Loon has a 25-bed hospital while Tubigon has a new 10-bed hospital. There are also 53 barangay health stations and rural health units in the 7 municipalities. These are staffed by nurses and midwives, and are aimed at delivering primary health care. Barangay health programs cover immunizations, maternal and child health, nutrition and health education. In some cases, there are also barangay health and nutrition scholars who act as local health volunteers in the absence of certified practitioners.

While Bohol has more than 150 rivers and springs and about 170 creeks, there are still not many level 3 water systems (Table 4.8). The water system levels in the profile area are as follows: 1 - dug wells, artesian wells, shallow and deep wells, other natural sources such as springs and creeks (e.g., Buenavista); 2 - all sources mentioned in level 1 but provided with limited or small-scale distribution lines (e.g., Inabanga and Getafe); 3 - large-scale water system, usually with water pumping stations, reservoirs and even water treatment facilities (e.g., Loon, Calape, Tubigon and Clarin). The demand for potable water is projected to grow at an average rate of 5 percent over the next 5 years. The Central Visayas Water and Sanitation Project (CVWSP) is one of the programs developing water systems for Bohol.

Table 4.8. Potable water supply (levels 2 and 3) (PHO 1999).

Municipality	Population	No. of water sources		Population served		Percentage served	
		Level 2	Level 3	Level 2	Level 3	Level 2	Level 3
Loon	31,503	1	4	866	18,404	2.75	58.42
Calape	27,184	5	6	2,934	8,915	10.79	32.79
Tubigon	34,786	12	7	9,701	12,594	27.88	36.20
Clarin	15,917	7	12	2,665	8,337	16.74	52.37
Inabanga	42,087	16	2	2,756	7,403	6.54	17.58
Buenavista	26,324	2	2	476	2,230	1.8	8.47
Getafe	26,257	2	0	2,412	0	9.18	0

A high incidence of infrastructure development is reflected in Tubigon's water supply of 64.08 (levels 2 and 3) percent. However, Tubigon is already experiencing shortages within the potable water delivery system, and this can only worsen as the population increases. On the other hand, highly rural Getafe and Buenavista have little

supply of potable water. In fact, Getafe is considered by the provincial government to have no supply of safe drinking water (PPDO 1993a). Surprisingly, highly-populated Inabanga has a very poor public water system despite the presence of 16 sources of water including the Iwahig-Inabanga watershed, one of the most extensive in Bohol. Loon, on the other hand, has abundant supply of potable water despite having only 5 sources for levels 2 and 3 water supply.

Coliform contamination is present along the entire coastline of the profile area (Table 4.9). In many cases, garbage is prevalent in the seawater, the source being the dense clusters of housing along the seashore. The primary source of coliform contamination is faeces, since approximately half of the coastal inhabitants do not have toilet facilities. In Inabanga, contamination from upstream communities along the Inabanga River can also contribute to seashore contamination. Animal production facilities, such as piggeries, are another point-source of contamination. Examples can be found in the large-scale swine raising projects along Calape Bay and a poultry business in Lintuan, Loon.

Table 4.9. Most probable number (MPN) of total coliform counts per 100 ml of seawater (SUML 1997).

Site	Nearshore	0.5 km offshore	1 km offshore
Getafe	4	24	14
Inabanga	8,950	10,800	49
Tubigon	12,600	1,530	694
Buenavista	484	1,523	308
Clarin	154	32	32

EDUCATION

There are many elementary schools in the profile area, which is common throughout the Philippines. High schools and vocational schools and colleges are less common. As a result, approximately 75 percent of the coastal inhabitants have attended elementary school, but only 11 percent high school. Only 9 percent have some college/ vocational training. In the 7 municipalities, there are 101 primary schools, 92 elementary schools and 32 secondary schools. The elementary schools have an approximate teacher-pupil ratio of 1:30 (PPDO 1993b).

For post-secondary education, there are 2 colleges: the Central Visayas State College of Agriculture, Forestry and Technology (CVSCAFT) and Mater Dei College in Tubigon. CVSCAFT has 2 branches in Calape and one in Clarin. There are 3 other campuses of the CVSCAFT system. These are located in Candijay (east), Tagbilaran (southwest) and Bilar (interior, main campus). The University of Bohol started offering college courses at its high school branch in Loon, but had to close the college unit for varied reasons: lack of

highly competent instructors, dearth of facilities, and low enrolment due to the proximity of Tagbilaran which is less than an hour away via public utility jeepneys.

The prevalence of elementary schools, added to the high rate of attendance and good teacher-pupil ratio, indicates that elementary classes are one of the best ways to provide grassroots environmental education to a large percentage of the populace. Attempting to reach only high school and college students would seriously limit the reach of environmental education in the profile area. Through education, it is possible to shape popular attitudes regarding waste disposal, resource depletion, habitat degradation and human encroachment. Unfortunately, the majority of the coastal inhabitants lack the advanced education necessary for better jobs and opportunities to improve their socioeconomic standing.

ROADS, PORTS AND TRANSPORTATION

There is a provincial circumferential highway that connects the coastal municipalities to one another, and to Tagbilaran City. The highway is a mixture of concrete, asphalt and gravel, although gravel dominates most of the sections in the profile area. The new circumferential road will be completed by the end of 2000.

Buses and jeepneys are the major sources of public transport, along with motorcycles (*habal-habal*) and tricycles which are erroneously called pedicabs in some places. The real pedicab is popularly called *traysikad*. Trucks are often used for hauling large loads of construction material between towns, while most small-scale vendors, farmers and fishers use the jeepneys and tricycles.

Tubigon is the secondary port (after Tagbilaran City) for Cebu-Bohol shipping, receiving an average of 114 shipcalls and 2,126 tons of cargo per month. It is also the most highly urbanized and developed municipality in the profile area. While Getafe is primarily a rural municipality, it is considered the major fish landing area for the northern part of the province and receives an average of 65 shipcalls (and 1,300 tons of cargo) per month.

The Asinan Port in Buenavista; Daet River Quay and Inabanga Port, Inabanga; and the Port of Clarin are primarily used for small vessels, motorized *bancas*, pump-boats and fishing boats. Much of what is transported to and from nearby islands and Cebu City consists of agricultural and marine products, and live animals.

Loon has a secondary port as well. Situated in barangay Catagbacan Norte, this port averages only 11 shipcalls (and 246 tons of cargo) per month. In comparison, Tagbilaran port handles 134 shipcalls (and 22,730 tons of cargo) per month. Loon and Tubigon will soon experience increased numbers of shipcalls, as traffic is routed away from Tagbilaran. The problem in the latter is limited berthing capacity. Up until 3 years

ago, there was ample space in the port. At present, it is not uncommon to see “boats queuing to dock in the seaport for 2 or 3 days before finding berthing space (MTDP 1997).”

The Bohol 2nd District Development Master Plan lists several infrastructure development projects that would affect the coastal environment over the next 5 years. RORO (roll on, roll off) ports are to be developed in Getafe, Clarin and Buenavista. A municipal port improvement is also proposed for Inabanga. Obviously, the dredging and construction activities will cause siltation and sedimentation, disrupt the water flow and increase chances of shoreline erosion, even while further degrading the surrounding habitats along the coast (i.e., mangroves).

Tubigon is expanding the wharf, which is encroaching into nearby mangrove areas. Not only has the construction caused mangroves to be cut, but workers and their families are establishing homes further and further within the mangroves.

While Tagbilaran and Tubigon are presently serviced by fast ferry lines to and from Cebu, Getafe may well become the next port of call. Getafe’s northern location makes it well-suited as a hub for ferry service connecting Cebu, Bohol and Leyte.

SUMMARY

More than 60 percent of the coastal inhabitants in northwestern Bohol live below the poverty line. The coastal communities are closely connected with the natural resources around them, with more than 50 percent engaged in fishing and fisheries-related endeavors, and only about 3 percent engaged in farming. In the fast-growing municipalities with high population density (e.g., Tubigon) there are signs of encroachment upon mangrove areas. This implies that land-use sustainability in the area may drop faster than the rest of Bohol. Meanwhile, solid waste management appears to be a growing environmental problem since, with the exception of Calape, all the municipalities do not have landfill sites.

Although social services are available, there is inadequate public health, potable water and advanced education. The impoverished social condition and lack of sanitary facilities threaten the small supply of potable water. On the other hand, roads and ports are currently upgraded and are expected to respond to the transport needs of the populace. There is, however, a need to consider port upgrading and other shoreline developments as having great impact upon the coastal zone. Improved shoreline land-use planning will be one solution to the increasing conflicts of use in these municipalities.

Chapter 5
ECONOMIC SECTORS

The economy of northwestern Bohol is not well diversified and resulting incomes are low. Reliance on the sea and land makes changes in the natural base of the area readily apparent in local incomes. Fisheries and agriculture are the mainstays of the local economy, while smaller industries have yet to make a substantial impact. Ecotourism and well-managed aquaculture have income-generating potential but have gained foothold only recently.

FISHERIES

Fisherfolk's Attitudes and Beliefs

Fishing is a subsistence livelihood in the profile area and many people start to work in the sea in their younger years. Quite seasonal, fishing peaks from March to June when there are large runs of pelagics (Spanish mackerels, scads, etc.) mostly in the south, east and west of Bohol. The fisherfolk observe that most species are gravid during this period and that, because the weather is calm and the water is warm, the fish rise to the water surface. During this period also, fishers from Mindanao are sighted within the province's seawater boundary. On the other hand, the subsistence fishermen just look at the sky or feel the wind to know whether or not the time is right for fishing.

Christmas day, Good Friday and other religious holidays are no-fishing days in Bohol. Fishing on Sundays is also sometimes frowned upon, although many people go to the beach with the family and catch fish for *kinilaw* (raw fish dipped in vinegar, salt and spices).

Most fisherfolk and their households are superstitious. For a new boat about to be set to sea, the fisherfolk would slaughter poultry or livestock and sprinkle its blood on the helm of the boat in a ritual called *padugo*. The owner's family and friends partake of the cooked animal after the *padugo* ceremony which they believe will bring in a bountiful catch and spare the owner of bad weather.

Many also believe that certain spirits inhabit the sea. For example, they believe that catching and eating whales, dolphins and turtles will bring *gaba* or curse to their person or their families because these animals also have souls. They also believe that bad spirits accompany them at times when there is no catch, so that while returning to dry land, they would drive away the spirits with hand gestures telling them to go back (*padulong*) to the sea. Some fishermen would collect flower petals, leaves and other pieces adorning their favorite patron saints during processions (most especially on Good Friday) and insert them into certain parts of their boats in the belief that doing so will bring in a bountiful catch.

Being mostly Catholic, the fishermen always take a respite from fishing and celebrate the annual feast day of the patron saints of their villages. By social custom, some fishermen place under taboo certain areas they hold sacred or think as having an inviolable nature. Non-observance of these traditions signals trouble and bad luck.

Aside from fishing, households of coastal communities glean for shellfishes, crustaceans and seaweeds at daytime (*panginhas*) and at night (*panulo*, aided by kerosene-fueled gauze lamp and spear gun). Like fishing, gleaning not only supplies food on the table but also provides regular or extra income.

Superstitions and other beliefs are gradually being forgotten especially among the younger generation of fishers who go for bigger boats, nets and gear and are always in search of the "jackpot" catch that will make them "one-day millionaires".

Marine Fisheries

In the profile area coastal communities, fisheries and related industries appear to supplant traditional agriculture as the main source of livelihood. SUML (1997) reports that the majority of fishermen own their fishing boats *(bancas)*, and most boats are non-motorized (66.8 percent). Eighty-four percent of the boats are owned by the users, while the rest are rented or borrowed. The boats are hand-made, wooden, outrigger canoes, ranging in length from 8 to 18 feet. The designs of the boats, especially the outriggers, vary depending on the barangay or municipality of origin.

All of the surveyed fisherfolk use non-commercial fishing gear. This means that their boats have gross weights of less than 3 tons, and are allowable within municipal fishing waters. Typically, the number of operators required per gear ranges from 1 to 6

persons (Table 5.1). The cost of fishing gear is listed in Table 5.2. Many of the fisherfolk purchase their gadgets and other paraphernalia in Tubigon where vessels plying the Cebu-Bohol route dock everyday. Crossing the Bohol Strait takes at least 2 hours. With the availability of fast crafts, travel time has been shortened.

Table 5.1. Fishing gear used in the profile area (SUML 1997).

Classification	Gear type	Local name
Lift nets	Cast nets	*yabyab*
	Fish nets	*bilaw*
	Scoop nets	*sikpaw, papyaw*
Pull nets	Baby trawl	*palakaya*
	Push nets	*sudsud, dosdos*
	Seine net with scaring devices	*liba-liba, ring-ring, kubkob, de-ring*
	Ring nets	*lawag*
Entangling nets	Bottom set gill nets	*pukot*
	Drift gill nets	*pangasa, pamo*
	Gill nets	*pukot*
	Set gill nets	*pukot*
	Squid nets	*pang-nokos*
	Two-ply	double-net
	Fish corral	*bunsod*
Barriers and traps	Fish pot	*panggal*
	Fish trap	*bobo*
	Bamboo structure with lift net	new look
Line	Jigger	*sarangat, panglabyog*
	Single hook and line	*pasol, latak, subid*
	Multiple hook and line	*palangre, kitang*
	Line with no hook	*rentex*
	Troll lines	*subid, subid-subid*
Hand instrument	Spear gun	*pana*
	Spear gun with compressor	*buso*
	Gleaning	*panginhas*
	Barehand	*panalum*
	Torch/Kerosene-fueled lamp	*panulo*
	Torch with scoop nets	*panulo*
Others	Dynamite	*tiro, dinamita*
	Sodium cyanide	cyanide, *kuskos*
	Poison seeds	*lagtang*
	Poison vine	*tubli*
	Pesticides	*indrin*, malathion, muriatic acid
	Electricity fishing	*kuryente*
	Tobacco and tobacco-chili mix for small octopus	
	Purse seine	
	Drag seine	
	Baby ring net	*likom-likom*
	Bag net for schooling fish	*basnig*
	Drive-in net with scaring device	*sinsoro*
	Small drag seine, beach seine	*baling*
	Fine-mesh gill net	
	Small barrier nets	

Table 5.2. Cost of fishing gear.

Gear type	Cost (pesos)
Gill net	2,100 upwards
Double net	500
Hook and line	25
Panulo (kerosene-fueled gauze lamp and spear gun)	500
Non-motorized outrigger boat plus oar	2,500
Motorized outrigger boat (10 hp)	30,000
Large pumpboat with big engine (>10 hp)	100,000

US$1 = P40 in 1999

The top 10 fishing methods (in terms of reported usage) along the northwestern coast are:

1. Fish pot
2. Gleaning
3. Single hook and line
4. Multiple hook and line
5. Scoop net
6. Spear gun/spear gun with compressor
7. Drift gill net/*pamo*
8. Bottom-set gill net
9. Troll line
10. Double net

According to interviews at various landing sites, the 161 species of catch are composed of: 133 species of fish, 16 species of mollusks, 9 crustaceans and 3 echinoderms (SUML 1997). Of the different species, 54.5 percent are non-reef (mostly pelagic), 28.8 percent reef-associated and 16.7 percent unclassified. Table 5.3 lists the various species captured in the area.

The most abundant family of fish captured is Scombridae (mackerels and tunas). In terms of biomass, 12 pelagic and reef-associated species comprise approximately 20 percent of the total catch, while 31 demersals comprise 52 percent. The next most abundant catch consists of squid, which dwells in soft-bottom habitat, and crabs which are caught by bottom set gill nets, fish pots and traps. Shrimp caught in the sea are not an important component of the catch, and are more likely to be produced in fishponds, except in areas where the baby trawl is still in use, or areas with push nets and fine-mesh fish corrals.

In terms of effort, the highest catch per unit effort (CPUE) is reportedly dynamite fishing, which averages 17.5 kg/man-hour and has an average income of PhP 439/ man-hour. This method has the added distinction of being illegal as well. The next (and legal!) method is fish corrals. CPUE is a good indicator of success (or failure) in fishing management of coastal waters. Increased CPUE (in overfished areas) tends to reflect decreased fishing effort. It can also reflect improved productivity of shallow water habitats (Vande Vusse 1996), or the use of destructive fishing methods like dynamite.

Table 5.3. List of captured species reported by fishers (SUML 1997).

Species	Local Name	Species	Local Name
Anchovies		*Siganus guttatus*	*kitong*
Stolephorus sp.	*bolinao, libod*	*Siganus spinus*	*danggit*
Barracuda		*Siganus virgatus*	*tagbago*
Sphyraena barracuda	*pangalwan, tabangko*	Rays	
Big eyes		*Dasyatis* sp.	*pagi*
Priacanthus sp.	*buan-buan*	Sardines and herrings	
Cardinalfish		*Sardinella*	*mangsi, caraniase*
Apogon sp.	*moong, pangan*	Scads and jacks	
Cutlassfish		*Alectis ciliaris*	*samin*
Trichiurus haumela	*panangitan*	Scorpionfish	
Trichiurus lepturus	*liwit*	*Sebastes* sp.	*bantol*
Damselfish		Seabreams	
Abudefduf sp.	*kapal*	*Scolopsis cancellatus*	*salingukod*
Chromis sp.	*pata*	*Scolopsis ciliatus*	*gapas-gapas*
Pomacentrus sp.	*pata*	Silversides	
Emperor breams		*Atherina* sp.	*guno*
Lethrinus sp.	*katambak*	Slipmouths	
Flatfish		*Gazza minuta*	*kiampe, sapsap*
Crossorhombus sp.	*dali-dali, palad*	*Leiognathus* sp.	*sapsap*
Flyingfish		*Leiognathus bindus*	*parutpot*
Cypselurus sp.	*barongoy*	*Leiognathus elongatus*	*parutpot*
Fusiliers		*Leiognathus fasciatus*	*lawayan*
Caesio caerulaureus	*bilason*	*Leiognathus splendens*	*lawayan*
C. erythrogaster	*sulid*	Snapper	
Glassyfish		*Lutjanus* sp.	*maya-maya*
Ambassis sp.	*ibis*	*Spratelloides* sp.	*turnus*
Goatfish		Stingrays	
Liza sp.	*yakmo*	*D. kuhili*	*kuyampaw*
Parupeneus sp.	*timbungan*	Surgeonfish	
Upeneus sp.	*saramulyete*	*Naso* sp.	*bagis*
Upeneus sulphureus	*timbungan*	Tarpons	
Gobies		*Megalops cyprinoides*	*buan-buan*
Cryptocentrus sp.	*banghutin*	Threadfin breams	
Grouper		*Nemipterus* sp.	*silay, lagaw, bakay, tuwas, tulirit*
Cephalopholis	*suno*		
Epinephelus sp.	*galot, lapu-lapu*	Tiger fish	
Halfbeaks		*Pelates quadrilineatus*	*gong-gong*
Hemiramphus sp.	*sasa*	*Terapon jarbua*	*bogaong*
Indian halibut		Triggerfish	
Psettodes sp.	*palad*	*Balistes* sp.	*pakol, pugot*
Jacks		Whitings	
Caranguides armatus	*badlon, bakan, malapati*	*Sillago sihama*	*asohos*
Caranx sp.	*mamsa, lawayan, taway, laya*	Wrasses	
		Cheilio inermis	*tad*
Selar boops	*tamarong*	*Halichoeres* sp.	*labayan*
Selar sp.	*tamaraw*		
Selaroides leptolepis	*karabalyas*	**Invertebrates**	
Gnahanodon speciosus	*badlon*	Conch shells	
Lizardfish		*Lambis* sp.	*saang*
Synodus sp.	*bakan, tiki-tiki*	Cone shells	
Mackerels and tunas		*S. luhuanus*	*liswi*
Decapterus kurroides	*bodboron*	Cuttlefish	
Euthynnus affinis	*tulingan*	*Loligo* sp.	*nokos*
Scomberomorus commerson	*tanguigue*	*Sepia* sp.	*kobotan*
		Sepioteuthis lessoniana	*nokos*
Scombrid sp.	*panit*	Helmet shells	
Rastrelliger brachysoma	*agoma-a*	*Cassis cornula*	*budyong, tambuli*
Marine catfish		Jingle shells	
Plotosus sp.	*ito*	*Placuna placenta*	*tipay*
Mojarras		Melon shells	
Gerres oyena	*samook*	*Voluta* sp.	*kibol*
Gerres sp.	*samook, botowanon*	Octopuses	
Moonfish		*Octopus* sp.	*kugita*
Mene maculata	*buan-buan*	Penaeid shrimp	
Moray eels		*Metapenaeus* sp.	*pasayan*
Gymnothorax sp.	*hawig, buwanon, baybayon*	*Trachypenaeus*	*pasayan*
Needlefish		Portunid crabs	
Strongylura sp.	*balo*	*Portunus pelagicus*	*lambay*
Tylosurus sp.	*balo*	*P. sanguinolentos*	*kasag*
Parrotfish		*Thalamita* sp.	*kasag, kubaw*
Scarus sp.	*molmol, buntog, birig-birig*	Sea urchins	
Pentapodus macrurus	*tuwas*	*Diadema setosum*	*tuyom*
Pufferfish		*Salmasis bicolor*	*sawaki*
Canthigaster patoca	*tikong, botete*	Seahares	
R. kanagurta	*anduhaw*	*Dolabella auricularia*	*lokot*
Rabbitfish			
Siganus canaliculatus	*danggit*		

During a field survey by SUML researchers, it was noted that most of the fish species caught are small in size and low in weight. Only 2 out of 12 species were actually within the size range deemed proper for harvesting. This small size is an indicator that younger fish are increasingly being harvested indicating severe overfishing in the area. This overfishing decreases the potential for fish recruitment in the future.

Illegal Fishing Practices

Fish are not considered as a biologically renewable resource; they just hide away sometimes and at other times they appear. Most fishermen attribute a good catch to pure luck or *suwerte* and people nowadays have great admiration for those who are lucky in fishing. Sadly, however, many fisherfolk in the profile area have lost the art and skill in order to become *suwerte* and have resorted to illegal and destructive fishing methods. They have forgotten the local adage that "we did not inherit the sea from our forefathers; we merely borrowed it from our children". Following are some of the destructive, wasteful and inefficient fishing methods observed in the profile area.

***Dynamite fishing*.** Introduced during World War II, dynamite fishing has been regarded as an easy means of catching schools of fish. Local fishermen made hand bombs from leftover explosives that were gradually replaced by potassium fertilizer and sodium or ammonium nitrate. These chemicals, as well as the blasting caps, are readily available from Cebu City just across the Bohol Strait through well connected individuals.

Dynamite can be used year-round, most especially when the sea is rough, or when certain target species (e.g., schooling fishes) aggregate and form schools. Blast fishing is destroying large areas of corals in the profile area. In most cases, the dynamite users know that what they are doing is illegal and feel some remorse. Sadly, however, they have to carry on the practice to feed their families, although they express willingness to stop only if alternative livelihoods are available. Some of those who have been earning a lot from illegal fishing activities have become accustomed to living a good life and having much fun drinking and gambling. Meanwhile, the other members of the community or families do not complain because the fishers who have a lot of catch tend to share their proceeds (i.e., food, *tuba*, etc.) with their neighbors. This deters the latter from complaining.

For over 20 years now, the fishers of Mantatao, a small island off Calape, are notorious for using compressors, cyanide and dynamite while fishing in Loon up to Inabanga. The suppliers of the chemicals come in regularly from Cebu every 2 to 3 days via motorized boats. They also buy the catch and sell it in Cebu City. It is interesting to note that the Mantatao fishers also supply illegally caught fish and the obnoxious substances to other barangays of Loon and Tubigon. On the other hand, they have a very unique and strong fisherfolk association which requires each member

a weekly contribution of PhP 50 to the general fund which amounts to PhP 2,000 per week on the average when catch is high. This fund is used by the association to pay the fine imposed on members arrested for illegal fishing or, worse, bribe the arresting officers. Most of the fishers of Mantatao profess that they would stop their destructive methods only when an alternative income is available.

Dynamite fishing is also rampant around the islands of Cuaming and Hambongan (Inabanga), Nasingin and neighboring islets (Getafe), and Cabul-an (Buenavista). In Cabilao Island (Loon) some residents act as lookout for dynamite fishers, mostly relatives or friends, who are afraid of being caught by law enforcers. Once the blasting is done, they receive a good share of the catch. Scared that the dynamiters are armed, the other fishermen pretend not to notice and do not report the incident to concerned authorities. Meanwhile, they also dive for dead fish left uncollected by the blast fishers.

Two types of dynamite fishing are prevalent in the profile area: blasting near the water surface and blasting underwater at depths that require the use of compressors. Sometimes, the fishermen release dynamite to kill a small school of fish and leave the dead fish in the water. A second release is done when bigger predatory species come into the area to feed on the smaller fish.

Cyanide. Stunning the fish with cyanide is becoming more and more rampant in the profile area. On a smaller scale, this method is used for collecting aquarium species.

Mostly used by spearfishers to catch groupers and other larger species, cyanide has been used in a variety of ways. One of these is spreading the cyanide powder on bread or mixing it with cooked rice when preparing fish baits. The bait is dropped onto the water, with the fisherman pretending to use a hook and line. Another technique is suspending underwater a transparent plastic bag filled with the poison and some small fish to attract bigger fishes. Once there is a bite on the line or a school of fish moves near the area, the line is pulled hard to rip open the bag and release the chemical to the water. In 10 to 15 minutes, the stunned fish rise to the surface of the water. The most common method is pouring the cyanide solution into baby feeder bottles and squirting the chemical into coral reefs and crevasses killing the corals and stunning the fishes. This method has been employed by collectors of live grouper species.

Cyanide supplied in the profile area originates from Cebu City. The poison is sold in plastic packets for about PhP 35 (Loon price) per small cube, which can last up to 3 days of fishing. The presence of cyanide on poisoned fish is difficult to detect because of the absence of testing facilities. Also, regular sampling of fish is not done.

According to the fisherfolk, fish poisoned by cyanide have reddish, blotched eyes and foul-smelling intestines. They also deteriorate faster than those caught without the use of poisons.

Mantatao Island off Calape and the barangay of Tangaran, Clarin are examples of cyanide-using communities. They are also notorious for using dynamite and spearguns, leaving trails of destruction on the waters of Maribojoc, Loon and Calape up to Getafe. The very low coral cover of the Calape Bay has been attributed by many to these destructive fishing methods, which have been practiced since the 1970s.

Stories among the small-island communities in the area reveal that some cyanide-using fishermen frequent an islet off Clarin. They place cyanide into their trousers and wade in the water, gradually releasing the chemical. In a few minutes, fishes and other marine organisms just float on the water surface.

Other chemicals are similarly being used to catch fish. The fishermen simply scatter the powder poison on the water and wait for dead fish to appear on the surface. In rivers, fiercely toxic agricultural pesticides are dropped upstream. The stunned or dead fish are collected by hand or nets downstream or near the estuaries. The human health effects of eating fish caught with these various poisons is not well known, thus people do not worry about it. In contrast, the ecological impact is well known and should be a major concern.

Commercial fishing. *Likom*, or large trawlers and purse seiners equipped with ring nets, still encroach on the 15-km municipal waters within the profile area (Bureau of Fisheries and Aquatic Resources (BFAR) lists 27 registered commercial fishing boats in Bohol). Unfortunately, however, the Philippine National Police-Maritime Command (PNP-MARICOM) reports that 16 of Bohol's 30 coastal municipalities (including Tagbilaran City) have yet to declare their water boundaries. It was only in 1996 that the importance of delineating the province's municipal waters started to be recognized as a major issue. In that year, a commercial fishing operator filed a case in court questioning the powers of the LGUs to ban fishing activities within the 15-km radius and at a depth of 7 fathoms from the shoreline. Reacting to the court's dismissal of the complaint, 17 mayors filed petitions for the declaration of the municipal waters of their respective jurisdiction.

Some fishermen use high-wattage superlights which are dropped onto the sea to attract schooling species such as herrings and Spanish mackerels. Notwithstanding the Department of Interior and Local Government (DILG) memorandum that limits the wattage to about 800 kW per boat, some operators in and around Bohol use generators and light systems powered with up to 1,800 kW. They also operate well within the 15-km radius.

A lot of small fishers complain about the regular intrusion of commercial boats especially on the southern waters of Bohol during the peak season for pelagic fishes (March to June). The boats harvest fish within 5 km from the shoreline and, in some cases, within 1 km. Although shoaling pelagic fish are mostly caught, shoaling reef species such as *mamsa* (trevallies) juveniles have also been harvested. The commercial fishers, however, share the big catch with the local fishermen so that the latter will not complain when they come and fish in the area. At certain times of the year small fleets arrive in Bohol while local boats leave for other areas. Most *likom* operators in the profile area do not even come from Bohol, which makes this illegal fishing operation most inequitable for Boholanos. Usually originating from Cagayan de Oro, Siquijor, Bacolod and Cebu, these 'intruders', can be found in the Bohol Strait and in other fishing grounds of the province.

Bagongbanwa, an island off Tubigon, is surrounded by locally designed *payaw*, a fish aggregating device (FAD) usually made of bamboo poles and coconut fronds tied together, suspended near the surface of the water by buoys, and anchored to the seabed. The *payaw* attracts pelagic species, Spanish mackerels, tunas and other seasonal runs of fish. Those who set up the *payaw* inform the operators of *likom* when it is time to harvest the fish under it. A "jackpot" catch means up to 200 *banyera* of fish (1 *banyera* is equivalent to 40-50 kg of fish). The *payaw* owners get one-third of the total value of the catch, which ranges from PhP 10,000 to 30,000 per night of operation. *Likom* is totally illegal and not allowed within municipal waters. In Bagongbanwa, however, *likom* operates within the first 2 km of the municipal waters of Tubigon. In view of an existing municipal ordinance prohibiting this kind of fishing activity within the municipal waters, there is a need to investigate the operations of and arrangements between *payaw* owners and *likom* fishers.

A similar scenario is observed in Napo, a fishing community of Loon. Local fishers have established strong linkages with the commercial fishers of Bohol, Cebu, Negros and Camotes. When fish abound under the *payaw* (there are about 70 of them in Loon), they would contact commercial fishing operators through radio equipment provided by the latter. They would also warn them through radio whenever the local *Bantay Dagat* patrol team is around. The indiscriminate fishing leaves the small fishermen with almost nothing to catch, and ensures the fish are not able to carry through their spawning migration and recruitment cycle.

Fish stocks in Bohol are depleted by commercial fishing which encourages total harvest of fish, i.e., including the spawners. Thus, banning it outright from municipal waters is a must. The use of FADs should only be in combination with hook and line and small nets. Superlights or lightboats should also be banned totally.

In recent years, commercial boats have been equipped with sonars and 'fish finders' that have rendered the superlights useless. These contraptions allow fishing even during moonlit nights (which last a week) when fish are not attracted to other sources of light. An alarming situation indeed, because fewer and fewer fishes will now be able to escape and spawn. Some sonars can track other vessels including the *Bantay Dagat* patrol boat. In Loon, commercial fishers already know the logistics and schedule of the patrol team and the cat-and-mouse game is carried on everyday.

Fine-mesh nets. Most common in the profile area, fine-mesh nets such as the 'double nets' are used near seagrass beds and coralline areas. After casting the net onto the sea, the fishermen scare the fish, mostly juvenile, towards the net by throwing stones at them, shouting and swimming. Most fishermen think that it is not illegal to catch fish using fine-mesh nets especially if the catch is intended for household consumption only. On Pangangan Island, Calape large fine-mesh lift nets *(basnig)* have become a serious problem of the municipality, due to the indiscriminate catching of juvenile anchovies and siganids in huge quantities.

Other fine-mesh nets include the beach seines and those that are used for catching small species that do not grow beyond a certain size, e.g. *bulinaw* (anchovies). These nets are also used to catch *tagum-tagum* or *kuyug* (siganid or rabbitfish juveniles), *lap-ot* (anchovy juvenile) and other species that aggregate during full moon and at certain times of the year usually affected by tidal rhythms. These fishes are highly priced because they taste best as *kinilaw* (raw fish salad) or are processed into *ginamos* of the best quality. *Ginamos* is salted fish and eaten as appetizer or as main dish. Fine-mesh nets are also used to catch shrimp fry *(uyap)* which is a popular topping for green mango.

Liba-liba (seine net with scaring device), *palakaya* (baby trawl) and *lawag* (fine-mesh lift net) are common in the profile area, especially in Calape, Tubigon, Clarin, Inabanga and Buenavista. They are not only destructive but they also catch juvenile fish.

According to the fisherfolk, *liba-liba* was introduced in Bohol in the late 1980s from Leyte and Samar. The method involves the use of a seine with a scaring line. Also popularly known as *ring-ring*, *de-ring*, *hulbot-hulbot* or *kubkob*, it normally operates from very shallow areas up to depths of 50 m depending on the size of the net. Requiring very little manpower, larger units of this efficient technique can sweep an area of up to 17 ha per fishing trip.

Because of its fine mesh, *liba-liba* catches large amounts of juveniles and trash fish that do not have a ready market. It also scrapes the bottom of the sea thus causing turbidity, and catches a lot of invertebrates including eggs of squid and

cuttlefishes, as well as useless by-catch such as seagrasses, sponge, corals and many others. This degrades the actual soft-bottom communities. CPUE averages about 5 kg per hour. A larger and mechanized version called *de-zipper* is also used in the profile area. This gear requires 10 to 15 persons to operate, sweeps a wide area of seabed, and results in a very large CPUE.

Palakaya is commonly used in seagrass and soft-bottom areas. It is a net held with 2 plywood 'otter boards' at the back of a motorized boat. The trawl normally has a 'cod-end' or a small bag made of mosquito net (net with very fine mesh) that catches the juvenile fishes, shrimps and other small organisms. The net scrapes and damages the bottom areas, and catches too many juveniles and trash. *Palakaya* and *liba-liba* were introduced by BFAR during the late 1970s as a "more efficient" fishing method to be used by communities to enhance their livelihood.

Storage chemicals. Because of the high daytime temperatures in Bohol, a few fishing operators and fish buyers use chemicals (usually diluted formalin) instead of ice to prolong the storage life of the fish albeit giving off a slight smell. Others use a dye locally known as *indigo* to create a fresher and bluer or more purple look for pelagic fish so that they can demand a higher market price. Both are highly detrimental, with formalin literally "pickling" one's innards.

Aquaculture Development

In the mid-1970s, the Philippines encouraged the expansion of fishponds for the production of both *bangus* (milkfish) and *sugpo* (prawns) as a way of increasing protein intake and providing foreign exchange. This led to the development of mangrove areas and rice lands into fishponds. There are an estimated 1,258 ha of developed fishponds under 25-year Fishpond Lease Agreements (FLAs) in the province of Bohol (PPDO 1997). It is interesting to note that most FLAs in Bohol involve non-Boholanos and non-residents (i.e., Ilonggos and Cebuanos). According to the BFAR, there are 2,193 ha of fishponds in Bohol that are not covered by FLAs, almost twice the number with FLAs. Talibon, a neighboring municipality, has the largest area of illegally constructed fishponds at 506.5 ha. The status of fishponds in the profile area is presented in Table 5.4.

Much of the land bordering the profile area's coastline is classified as Sr (suitable for rice land), or Sf (suitable for mangroves and forest). In most coastal barangays, there are fishponds in varying stages of use. Many are locally owned and remain inactive, which makes them suitable for reversion to mangrove areas. Others are owned by outsiders and are operated on a large-scale, commercial production basis. For example, there are several intensive tiger prawn operations, but these are owned by businessmen from outside of Bohol. In addition, there are *nipa* plantations within much of the native mangrove areas. Mangrove species were replaced in the 1970s and

Table 5.4. Status of fishponds in the profile area (BEMO 1999; BFAR 1999).

Municipality	No. of lessees	With FLA (ha)	Without FLA (ha)
Loon	9	67.88	*
Calape	23	315.48	*
Tubigon	6	109.11	11
Inabanga	13	263.73	*
Buenavista	1	10.43	48
Getafe	14	156.57	410.2
Clarin			10
Profile area	**66**	**923.20**	**-**

** No data*

1980s with *nipa* due to its higher market demand at the time. With the advent of the metal roof, *nipa* is no longer as marketable as in the past and may decline in production.

The municipality of Calape (barangay Lawis) is home to the DA's Central Visayas Integrated Agricultural Research Center/Research Outreach Station. This facility conducts research on *bangus* (milkfish) breeding, prawn fry development, cage culture of *danggit* (rabbitfishes) and adaptability of *Eucheuma* species in 3 sites around Calape. Set up in 1986, it typically hosts 25-30 fisheries students per academic semester to allow them to have hands-on experience. While this type of complex is a valuable educational and awareness (as well as extension) facility, the majority of the students are from Cebu province, not Bohol.

Outside the research station are large tracts of fishpond most of which are underutilized or abandoned. There are also several intensive prawn (mostly tiger) ponds that are quite profitable but these are owned by businessmen mostly from Negros Oriental. A former local government official is known in Calape to have constructed some fishponds and sold them. Also, there had been so many local disputes regarding rights over fishponds and illegal expansion of fishpond areas that some mangrove pockets had to be entrusted to the Comprehensive Agrarian Reform Program (CARP) of the government for the issuance of FLAs to qualified applicants.

BFAR also manages the Calape Fishery Complex in Barangay Bentig. This was funded in the 1980s by the United Nations Development Programme, but is currently running low on resources. Several hectares of the milkfish fishponds were turned over to a federated fisherfolk organization as a livelihood project, but productivity is low.

Two of the biggest fishpond operators in Bohol established a prawn processing plant in Tubigon that produces high-quality prawns (head off/tail off; 1-kg frozen blocks) for direct export. Meanwhile, oyster culture, crab fattening and aquaculture techniques have been launched in Inabanga, Buenavista, Clarin, Tubigon and Calape.

TOURISM

The fledgling tourism industry continues to develop in Bohol, and is the provincial government's priority development thrust. In 1993, there were 22,779 foreign and domestic visitors, most of whom chose tour packages concentrating on Panglao Island, the Chocolate Hills, Baclayon Church and Antequera Market (DOT 1997).

There are not yet many established tourist hotels and resorts in the province. Hotels with air-conditioning are small, with a 20-30 person capacity. There are various hotel and resort establishments in the province, mostly located in or around Tagbilaran City. The average occupancy rate is 52.2 percent and the average length of stay is 5 nights (DOT 1997).

Bohol has a multitude of natural attractions, the more famous of which are the Tarsiers of Corella, the Chocolate Hills of Carmen and adjoining towns, the white beaches on Panglao Island and the underwater paradise of Balicasag, an islet off Panglao. These, however, are located outside the profile area. Table 5.5 lists some of the potential tourist attractions in northwestern Bohol. Noteworthy is the ecotourism potential of the Mualong river and watershed in Loon town which is considered the best preserved among Bohol's smaller rivers. The preservation of Mualong's pristine splendor is attributed to the townsfolk's proclivity to get employment or engage in business, thus leaving its banks almost untouched by any agricultural activity.

Nature-based tourism is one of the development thrusts of the provincial government. The latter seeks to protect watersheds and mangrove forests and to establish marine sanctuaries. With an emphasis on mangrove replenishment, the potential for bird and botanical sanctuaries raises itself for consideration. Walkways and observation towers, as well as tree-houses could be established for visitors to tour protected areas.

Another potential tourism attraction under consideration by the local tour operators is the utilization of local fisherfolk and their crafts. Fishing and sightseeing trips are being considered as possible income-generating activities by the local fisherfolk. In addition, Inabanga, Buenavista and Tubigon, main producers of raffia (stripped and dried palm leaves) products, may garner tourist interest for their handicrafts. These municipalities currently produce baskets and woven materials that are sold in Tubigon, Tagbilaran and Cebu City. Community theater is actively pursued in Napo, a densely populated coastal village of Loon. This tradition, which involves stage acting, singing and dancing, dates back to the 1920s and was only cut short by the World War II. Every fiesta time, Napo stages a 'drama' with the community members themselves as actors, directors, stage managers and playwrights. In nearby Tangnan, the Japanese art of bonsai has become a passion nurtured by young male members of the community.

Table 5.5. Potential tourist attractions and ecotour destinations in the profile area (PPDO 1993a; DOT 1997; PPDO 1997).

Municipality	Attractions/Destinations and significant information/features
Getafe	● Banacon Island: biggest man-made mangrove forest in Southeast Asia; bird watching; seahorse conservation ● Danajon Double Barrier Reef
Buenavista	● Old stone church ● Island-hopping ● Cambuhat river and oyster farm community
Inabanga	● Iwahig River: one of Bohol's extensive river systems ● Old stone church: on its churchyard were sown the seeds of the 85-year Dagohoy Rebellion (the longest anti-Spain revolt in the Philippines) ● Cantacoy Falls ● Cottage-type beach resorts in Pasil ● Hiking and camping
Clarin	● Island-hopping ● Upland viewing area
Tubigon	● Old stone church: declared a provincial heritage structure ● Inanuran island beach resort ● Island-hopping ● Matabao and Tinangnan beach resorts ● Potential dive sites ● *Buri*-based cottage industry
Calape	● Church: declared a provincial heritage structure; neo-Gothic revival style ● Pangangan Island: Treasure Island and Darak beach resorts; cottage-type beach resorts; bird-watching (migratory species) ● Bentig-Calunasan-Mandaug strip: broom-making *(buri)*; traditional cane milling and production of *tinunlob* (dried banana dipped in cane extract)
Loon	● Old stone church: "crowning glory" of the Recollect Mission in Bohol; declared a provincial heritage structure; biggest stone edifice in the province; ceiling paintings; Filipino baroque and *baldaquin* (*retablos*) of the neo-classical style ● Inang-angan: five flights of stairs (212 steps) made of hewn coral stones or *tinableya*; connects the old church to Napo (a coastal village which has a community theater tradition that dates back to the early 1920s) ● Cabilao Island: dive site; beach resorts; saltwater lake (migratory birds) ● Sandingan Island: beach resorts ● Mualong River: river cruising, kayaking, bird/monkey-watching; waterfalls ● Tubig-Loon: abundant spring water flowing from a cave beside the sea

Northwestern Bohol is expected to experience an influx of tourists from Cebu City because of its proximity. In anticipation of this development, the local office of the Department of Tourism (DOT) has developed tourist circuits or loops with focus on certain themes (i.e., nature trips, heritage tours, etc.). These, however, are concentrated on Chocolate Hills, Panglao Island and some southern towns, despite the rich potential of the western and northern towns. Meanwhile, the 40-member Bohol Association of Hotels, Resorts and Restaurants is actively pursuing collaborative efforts to support tourism in the province.

The potential of the profile area for tourism is, however, hampered by a multitude of problems, among which are high coliform count, lack of electricity and lack of potable water particularly in coastal and island communities. Small-scale electric power plants, though, have been established on a few islands. Getafe has the safest coastal water for public swimming, but is hampered by lack of potable water supply and little electricity. Currently, the low coliform count in the town's coastal waters supports it as a potential destination. A projected problem is that population pressure from municipal centers will push squatters into mangrove areas. This encroachment threatens natural ecosystem patterns and the potential of nature tourism.

SMALL- AND MEDIUM-SCALE INDUSTRIES

There are many small-scale industries in the 7 municipalities of the profile area, most of which are handicraft. The materials used are shells and the native-grown bamboos and palms, such as *nipa* and *buri*. There is also a growing hollow-block production, which is burgeoned by increasing construction in the area. Unfortunately, this business is dependent upon sand extracted from beaches which will have an impact on the "white-sand beaches" for which Bohol is renowned.

Many of the small-scale industries cannot expand their operations for a variety of reasons. Most of the employees are only part-time workers who tend to revert to farming and fishing for their main source of subsistence. The lack of financial support, poor marketing linkages and the resulting low human resource development lead to weak infrastructure and facilities.

The municipality of Tubigon is in the process of expanding its urban center to accommodate a new industrial area. This industrial center will reportedly focus on low-level technology such as textile and clothing manufacturing. Depending upon the base of the various dyes, there may or may not be a problem with industrial effluents into the surrounding environment. Buenavista is targeted for the establishment of a ceramics and glass industry, while Getafe is slated for an Industrial Estate Development. In fact, all of the profile area municipalities are proposed Bohol Special Economic Zone (BSEZ) sites. Tubigon, Calape and Loon are BSEZ priority sites, while Getafe, Buenavista, Inabanga and Clarin are secondary sites.

AGRICULTURE

Ninety-one percent of the profile area consists of rural households most of which depend on agriculture and agro-related industries as the major source of income.

Water for the agricultural land comes from the Inabanga River and the 3 major watershed systems in the area. There is a series of waterworks within each municipality that are utilized for servicing 918 ha. There are approximately 45.6 km of irrigation canals, and most soils are clayey which is beneficial for the development of rice fields.

On the average, 78 percent of the total land area is used for agriculture. This is approximately 38,791 ha of land (PPDO 1993b). The people living in Getafe, Buenavista, Inabanga, Tubigon and Clarin engage mainly in rice farming and coconut growing. Coconut plantations account for 36 percent of the agricultural land use in the area, while rice takes up 15 percent.

Coffee and cacao are other important crops. The rest of the area is left for corn, root crops, legumes and bananas. The planting of mangoes in areas devoted to coconut and rice is fast gaining popularity. On the average, farming households manage approximately 3 ha, which illustrates the low labor requirement of the agricultural sector.

Rice and coconut are the most important cash crops. Corn, root crops and legumes are typically for household consumption and are considered to be subsidiary food crops. Livestock production is also typically for household consumption, and tends to consist of hogs and poultry. While some cattle are raised in backyard lots, cattle raising is not common among most households. Ducks are raised for their eggs and goats for their meat (on a small scale). Carabaos (water buffaloes) are utilized as draft animals in rice paddies and typically butchered when they are too old to plow effectively. Carabao meat is a popular fiesta fare in Bohol, especially in Loon where more than 200 heads of the beast of burden are butchered during the annual celebration of the town's fiesta.

High-value crops (HVCs) are being promoted by the DA under Republic Act (RA) 7900. These are crops that can be optimally and sustainably produced in the area, and can generate revenues higher than that of traditional crops. These include citrus, mango, rambutan, watermelon, coffee and cacao as well as a variety of vegetables, fruits and flowers.

While some of these HVCs can theoretically generate more income, for the most part there is a problem with marketing. Many of the HVCs are not commonly eaten by rural communities, and sales must occur in the public markets of Tagbilaran or Cebu for farmers to make money.

Rice land in Bohol, which is mostly rainfed, has an average yield of 2.9 mt/ha, while the regional average yield is 1.79 mt/ha (DA 1997). The province is in fact the rice granary of Central Visayas. The average yield in Bohol for corn is 0.6 mt/ha (compared to the regional average of 0.8 mt/ha), while vegetables and root crops yield an average of 10.97 mt/ha. Coffee, cacao and spices have much lower average yields. Coffee yields an average of 0.02 mt/ha, while cacao yields 0.0001 mt/ha. Spices yield 1.37 mt/ha (DA 1997; Governor's Report 1997-1998). This should encourage part-time growers with small plots to grow spices/condiments for sale in local markets,

instead of attempting to grow other HVCs. As inter-island transportation becomes more routine and travel costs drop, it may become more viable for farmers to market their goods in Cebu.

In terms of nutrition and production, root crops are the better home-consumption crops for people to grow. Not only is there a high yield, but the starch and caloric contents are higher than those of rice. These crops, however, have not established themselves as a major staple food, although production of *ube* (particularly the *kinampay* variety) is a profitable venture as experienced by some farmers on Panglao Island and a few other rainfed areas.

SUMMARY

Fisheries and agriculture are the main economic activities in northwestern Bohol. While there are a lot of small-scale industries in the area, they are not able to expand due to a variety of reasons. What is clear, however, is the direct relationship between agriculture and fisheries and the quality of habitat in which they thrive. This quality of coastal habitat is in turn strongly related to the quality of life of the people in the vicinity. As upland areas erode and coastal habitats become degraded, all economic sectors suffer and thus living standards for most people.

In recent years, however, fishing is not only subsistence. It has become a big source of income especially among fishing operators who encroach on the municipal waters of northwestern Bohol as well as those who engage in highly extractive yet illegal methods such as using dynamite. Illegal fishing practitioners know that what they are doing is environmentally destructive and an infraction of the law, but they either refuse to engage in alternative livelihood or do not have the opportunity to do so.

Alternative income-generating projects in the profile area include diversified farming, limited aquaculture and tourism, and expansion of small-scale “cottage” industries. If properly planned and managed, these can provide more jobs and income. The decision rests with the local communities to pursue different avenues of employment, which could be carefully designed into an integrated development management plan.

As mentioned in previous chapters, incomes are relatively low among coastal inhabitants of northwestern Bohol. This is due, in part, to the low CPUE for normal fishing methods. In addition, fish species that are caught are generally undersized, which adds to the trend of low income generation. Mangrove conversion to fishponds has not solved the problem of poverty, since idle fishponds and low productivity remain the norm. A program of rehabilitation of these unproductive areas needs to be embarked upon. Aquasilviculture and community-based management of mangrove forests offer good possibilities.

Even though there are many small-scale industries at the local level, these continue to be part-time in nature so expansion has not yet occurred. However, these industries form the base of alternative income-generating projects, while the natural beauty of selected sites may enable nature tourism to gain a foothold in the area.

Chapter 6
INSTITUTIONAL and LEGAL FRAMEWORK

Previous natural resource management efforts in the Philippines reflected a top-down approach to governance. Currently, the legal and institutional issues of coastal management have been changed by the devolution of many responsibilities under the Local Government Code. The following section maps out the framework of responsible institutions at the national, provincial and local level for CRM in northwestern Bohol.

INTRODUCTION TO COASTAL MANAGEMENT

Management of coastal resources are governed by various national and local institutions. At the national level, coastal resources are under the jurisdiction of the DENR and the DA-BFAR. The DENR is responsible for coastline development, mangrove management and management of all areas which are government-owned. The BFAR covers all fishery-related products harvested in coral reefs, open seas and brackishwater ponds. Since managing human behavior is the underlying theme of CRM, other agencies such as the DSWD, Department of Education, Culture and Sports (DECS), DILG, Philippine Coast Guard (PCG) and the Department of Justice (DOJ) now play important roles in CRM.

NATIONAL POLICY AFFECTING COASTAL MANAGEMENT

The natural resource programs of the Philippines fall under the auspices of the Philippine Strategy for Sustainable Development. All of the national and regional policies related to ICM should conform to the general guidelines set forth in the strategy. Some of the relevant components of the strategy's agenda are as follows:

- Integration of environmental considerations in all decision-making processes;
- Proper valuation of resources used based on the cost of replenishment and the provision of appropriate substitutes for such resources;

- Promotion of equitable access and tenurial security to resources;
- Rehabilitation of damaged ecosystems;
- Strengthening of pollution control in industry; and
- Promotion of environmental education, as well as citizen's participation in the planning and implementation of government programs.

A National Marine Policy was adopted by the Philippines in order to develop a comprehensive program to properly manage coastal and marine resources in compliance with the UN Convention on the Law of the Sea. This policy calls for an integrated coastal zone management system that considers the archipelagic and coastal nature of the country. The Philippines is one of the founding partners of the International Coral Reef Initiative (ICRI), and has begun to establish a Philippine Reef Database through "Philreefs" together with the University of the Philippines Marine Science Institute.

The DENR launched the Coastal Environment Program (CEP) in 1993 in an effort to enhance public awareness and participation in coastal management. In addition, a National Integrated Coastal Management Training Program was initiated to develop the capability to design training programs for a multisectoral pool of coastal management practitioners.

The management of coastal resources involves many LGUs and national government line agencies. Traditionally, the line agencies most involved with coastal management issues are the DA-BFAR and the DENR-CEP. Under the policy of devolution, the 1991 Local Government Code gives more authority and responsibility for governance to the LGUs. This means that the provincial government, municipalities and even barangays may now influence natural resource management issues. The DILG is the overseeing agency that ensures that LGUs exercise their obligations in a responsible manner.

Under devolution, the DENR offices at the provincial level -- PENRO and CENRO (Provincial and Community Environment and Natural Resource Offices) -- oversee the management of coastal habitats, as well as upland forests and protected areas. In addition, the Office of the Provincial Agriculturist (OPA) has a fisheries section which manages various brackishwater mariculture projects around the province. Traditionally, the fisheries section works with local fisherfolk and fishing associations on production and capture issues. Each municipality also has a Municipal Agricultural Officer (MAO) and occasionally a fishery technologist to implement projects at the local level. Under the Philippine Fisheries Code of 1998 (RA 8550), the BFAR becomes a line bureau, which means that it may establish provincial and municipal offices.

The Philippine Fisheries Code has integrated conservation provisions within the framework of the utilization and management of fisheries and aquaculture. These provisions fall under 5 broad categories:

- Limit the volume of catch;
- Limit access to fishing areas;
- Directly protect certain species;
- Protect habitats; and
- Provide institutional mechanisms for managing resources.

The Code enhances conservation measures through a policy of sustainable development, regulations for limiting access and imposing penalties on violators.

The Municipal Local Government Operations Office (MLGOO) of the DILG works with the various municipal officials to guide them through the legalities of their functions. While coastal management is supported by law, there is a need for the MLGOOs to take a more active role in advocating CRM.

In 1996, President Ramos signed Executive Order 240 regarding the establishment of Fisheries and Aquatic Resource Management Councils (FARMCs) at the municipal level. These councils are supposed to consist of fisherfolk representatives, NGOs and municipal officials. The rationale for this type of council is to give local resource users a conduit to municipal officials, and let them participate in the management of coastal resources within the 15-km municipal waters. The FARMC also strengthens and supports the Local Government Code statement that allows different LGUs to coordinate and collaborate with each other on relevant issues. In this case, 2 or more barangays and/or municipalities may work with each other within one FARMC. This ensures that fisheries policies can and will remain consistent along the coastline.

Under Philippines 2000, each province is charged with developing itself into an agro-industrialized state, taking natural resources into consideration. Thus, each LGU should preserve and utilize resources in a sustainable fashion. In addition, nature tourism is growing in the Philippines, which means that LGUs recognize that care must be taken with their resources to attract foreign currency. Unfortunately, many LGUs have yet to begin coastal zone planning and management.

Protected Areas along the Northwestern Coastline

The National Integrated Protected Areas System (NIPAS) was established to conserve "outstanding remarkable areas and biologically important public lands that are habitats of rare and endangered species", both terrestrial and aquatic. These areas are protected to maintain biodiversity against the threat of human encroachment and exploitation.

Protected seascapes are characterized by interaction between humans and the environment for the provision of public enjoyment through tourism and recreation. This interaction takes place within the normal lifestyle and economic activities of the area. Resource reserves are often isolated and uninhabited, and are protected for future use. Strict nature reserves possess outstanding ecosystems and serve as examples of the

natural environment for study, monitoring, education and the maintenance of genetic resources.

Presidential Proclamation 468 established the Iwahig-Inabanga River Watershed Forest Reserve. This includes areas of Inabanga, Buenavista and Getafe. In addition, Presidential Proclamations 2151 (1981) and 2152 declared a number of areas along Bohol's northwestern coastline as protected areas under Mangrove Swamp Forest Reserves and Strict Protection Wilderness Areas (PPDO 1997). These include the following:

- Loon Mangrove Swamp Forest Reserve;
- Clarin Group of Islets Wilderness Areas;
- Inabanga Mangrove Swamp Forest Reserve;
- Iwahig-Inabanga Watershed;
- Getafe Group of Islands Wilderness Areas;
- Buenavista Mangrove Swamp Forest Reserve;
- Calape Protected Seascape,Landscape and Strict Protection Zone (Pangangan, Poom and Basihan Islands); and
- Batasan Island (Tubigon) Protected Landscape and Seascape.

It should be noted that although these areas are covered by laws for their protection or conservation, such legislation needs to be ratified by Congress. It is judicious to adopt a precautionary approach in all these protected areas since the legislative process for the protection of certain areas takes time. It is advantageous for the LGUs to take the lead in managing these areas.

MANAGING COASTAL RESOURCES THROUGH THE LOCAL GOVERNMENT CODE

Municipal Local Government Unit

Under the 1991 Local Government Code (RA 7160), the LGU has the primary responsibility for CRM. For the municipality, there are 4 relevant sections in the Code. These are:

- Section 17 (Book I, Title I, Chapter 2);
- Section 149 (Book II, Title I, Chapter 2, Article Two);
- Section 444 (Book III, Title II, Chapter 3, Article One);
- Section 447 (Book III, Title II, Chapter 3, Article Three);

as well as the Memorandum of Agreement between the DA and the DILG (signed 5 April 1994).

In general, the municipality has the following CRM responsibilities:

- Legislate for the general welfare;
- Impose penalties for acts which endanger the environment;
- Grant permits for fish corrals, fish pens, aquatic beds, taking of fish/prawn fry;
- Adopt measures for conservation;
- Enforce fishery laws in municipal waters;

- Provide research services and facilities related to fishery activities;
- Initiate activities for the conservation of mangroves;
- Give exclusive authority to grant fishery privileges in municipal waters;
- Issue licenses for fishing vessels weighing 3 tons or less;
- Issue permits to construct fish cages in municipal waters;
- Issue permits to gather aquarium fishes within municipal waters;
- Establish fishing seasons in municipal waters;
- Issue permits to collect mollusks;
- Issue licenses for seaweed farms within municipal boundaries; and
- Issue auxiliary invoices to transport fishery products.

Provincial Local Government Unit

The *Sangguniang Panlalawigan* (SP) has the following relevant responsibilities for CRM: impose penalties for acts which endanger the environment; adopt measures for conservation; review the ordinances of the municipalities; and pass ordinances and resolutions.

The Governor has the following general responsibilities: issue and revoke permits to extract natural resources; adopt measures for conservation; and the general supervision and control over all provincial programs and projects.The provincial government department charged with updating the Governor on these aspects is the Provincial Planning and Development Office (PPDO).The PPDO typically plans for development through the Provincial Physical Framework Plan (PPFP).

The PPFP, which is a strategic, spatial, 12-year plan, recognizes that nature tourism is a pathway for the future development of Bohol. As a result, Bohol's intended strategy calls for an ecotourism flavor to island development. This means that:

- Watersheds and mangrove forests will be protected, and marine sanctuaries and coastal management zones will be established to preserve tourist attractions;
- Major tourist spots will form the core of development infrastructure; and
- Agricultural development will focus on prime agricultural lands, aquaculture and resource-based cottage industries.

While there are no specific guidelines within the PPFP for this proposed development thrust, the medium-term development plans for the first and second congressional districts of Bohol do reflect many of these goals within its proposed plan of action.

The Governor of Bohol initiated an Environment Summit to enhance public awareness and target specific areas for government intervention. The Summit began in mid-1997, and was a 3-month effort to compile environmental concerns and potential government-led initiatives in the province. The resulting information was presented to the provincial legislative council for the creation of the Bohol Environment Code (see Box 6.1). The Governance and Local Democracy (GOLD) project of USAID facilitated surveys pertaining to coastal issues and concerns.

The Bohol Environment Code integrates existing national laws into the local governance system. It includes 9 major articles: forest resources; mineral resources; water resources; integrated solid waste management; coastal resources; air and noise pollution management; ecotourism; environmental impact assessment; and land-use planning and organization.

Box 6.1. The Bohol Environment Code and the coastal zone.

The Bohol Environment Code was approved on 27 March 1998 and its Implementing Rules and Regulations are currently being prepared by the newly-formed BEMO. The provisions of the Code are in coordination with the following national laws:

- RA 7160 (Local Government Code of 1991);
- Executive Order No. 240, series of 1995 (creation of FARMCs);
- RA 8550 (the Philippine Fisheries Code of 1998);
- Presidential Decree No. 705 (Forestry Decree of 1975);
- Presidential Decree No. 601 (tasking the Philippine Coast Guard in marine environmental protection);
- RA 6975 (creating the PNP-Maritime Command under the DILG);
- RA 5173 (Philippine Coast Guard Act of 1957); and
- Executive Order No. 247 series of 1995 (establishing a regulatory framework for the prospecting of biological and genetic resources).

Through the Code, the provincial government states as its policy "to strongly and irrevocably support governments and communities of coastal municipalities in the full exercise of their powers, duties and responsibilities towards proper management of our municipal waters." The provincial government recognizes the transboundary character of the issues and problems confronting Bohol's municipal waters, and will provide "active leadership, technical assistance, conducive policy, and effective law enforcement" for the conservation of marine resources in Bohol.

Bohol Environment Management Office (BEMO)

One of the landmark mandates of the Bohol Environment Code is the creation of the BEMO under the direct supervision of the Governor. The BEMO shall share responsibility with the municipal governments, the DENR, and other cognizant national government agencies for the effective protection, development, management, rehabilitation and conservation of the environment and natural resources of the province; the regulation and operation of licensees, lessees and permitees for the taking or use of natural resources; the implementation of LGU-driven coastal, forest, mineral, ecotourism and water resources management, including waste management and the control of water and air pollution; and the enforcement of environment and natural resources laws, rules and regulations.

The following are the specific functions of the BEMO:

- Assist municipal governments and barangay councils, including environmental organizations, through the provision of technical assistance such as, but not limited to, development of environmental management organizational capability, participatory formulation of environmental programs, mobilization of local and external pool of

environmental specialists, and guidance in the formulation and implementation of environmental laws;

- Develop a multi-year environment management framework plan for the promotion of LGU-driven community-based and livelihood oriented initiatives, particularly tree enterprises, watershed management, ecotourism, CRM, solid waste management and participatory land-use planning;
- Establish and operationalize internal and external linkages and networking system that will maintain and expand LGU-driven environmental initiatives;
- Develop and implement environmental programs through the promotion of best-of-the-moment methods, processes and approaches by establishing showcases within Bohol for the LGUs to adopt in their respective jurisdictions;
- Establish linkages with national and international institutions for purposes of fund sourcing, network building, research and information/data bank generation;
- Organize a network of lobby/advocacy groups by maintaining a provincial network of environmental organizations;
- Facilitate and coordinate the holding of provincial environment summits to be held in June or July of each year where a cross section of the Boholano community will resolve issues with regard to natural resource utilization and management;
- Install a one-stop-shop and quick response desk that will be manned by an interdisciplinary, interagency and multisector team whose task will be to facilitate calls for fact-finding missions, monitoring and investigation of controversial environmental issues in the province;
- Encourage municipalities to group themselves into clusters to address common concerns, such as law enforcement in municipal waters, protection of river systems, watershed management and pollution control, as stipulated in the Local Government Code; and
- Recommend to the Governor implementing rules and regulations for the Bohol Environment Code.

Currently, the BEMO implements the following programs and services: Participatory Land Use Planning; Forest/Watershed Management; Integrated Solid Waste Management; Water Quality Monitoring; and CRM. As regards the latter, the BEMO serves as CRMP's partner for Bohol in the conduct of activities in the profile area.

Before the creation of the BEMO, the Office of the Provincial Agriculturist (OPA) was rendering such services as planning and management, community organizing and stewardship, resource rehabilitation, policy development and law enforcement, and information, education and communication (IEC) to the municipal LGUs. CRM was covered by these services. With the establishment of the BEMO, the OPA now focuses on agri-business and coastal livelihood development, which are only sub-components of CRM. The CRM section of the BEMO has only a tiny budget and 2 staff members, compared to the original 23 personnel of the OPA practicing CRM when CRM was still part of its

mandate. It is interesting to note that CRM staff and resources of the OPA have still not moved to the BEMO. The BEMO's very limited resources are further emphasized by its very broad mandate.

Duties of the Bohol Provincial Government

The provincial government will help capacitate the municipal LGUs to provide the following CRM services:

(i) Enforcement of fishery laws (national and local) in municipal waters including the conservation of mangroves, extension and on-site research services and facilities related to fishery activities, including aquaculture;
(ii) Provision of fish ports, seawalls, dikes, drainage and sewerage, and flood control services;
(iii) Coastal/marine tourism facilities and attractions, including the acquisition of equipment, regulation and supervision of business concessions;
(iv) Implementation of community-based forestry projects, establishment of new regular reforestation projects, except those located in protected areas and critical watersheds and completed family- and community- based contract reforestation projects;
(v) Management and control of communal forests with an area not exceeding 5,000 ha;
(vi) Establishment and maintenance of tree parks, greenbelts and other tourist attractions in areas identified and delineated by the DENR, and the collection of fees;
(vii) Except for import and export, the regulation of flora outside protected areas including industries and businesses engaged in their propagation and development;
(viii) Implementation of the Rehabilitation in Conservation Hotspots (RICH) and the Conservation of Rare and Endangered Species (CARE) activities in areas identified and delineated by the DENR; and
(ix) Implementation of waste disposal and other environmental management systems and services related to general hygiene and sanitation, such as sewage and household wastes disposal.

At the provincial level, the government will provide the following services:

(i) Assistance to fishermen's cooperatives and other collective organizations;
(ii) Enforcement of community-based (mangrove) forest management laws and other laws on the protection of the environment;
(iii) Coastal tourism development and promotion programs;
(iv) Enforcement of pollution control and environmental laws, rules and regulations such as issuance of Environmental Compliance Certificate (ECC);
(v) Adjudication of cases involving complaints against businesses;
(vi) Apprehension and testing of smoke-belching vehicles and collection of appropriate fees and charges;

(vii) Abatement of noise and other forms of nuisance;
(viii) Implementation of Cease and Desist Orders issued by the Pollution Adjudication Board;
(ix) Enforcement of the small-scale mining law; and
(x) Enforcement of forestry laws limited to community-based forestry projects particularly in municipal/city communal forests, integrated social forestry areas and small watersheds.

Zoning of Municipal Waters

Within 2 years of the Code's adoption, the Governor will encourage the municipal mayors, coastal inhabitants and concerned national government agencies to complete the delineation, establishment, management and maintenance and protection of their municipal waters. Contiguous municipalities should delineate their boundaries jointly in order to avoid future controversies in boundary lines. No fishery privileges are to be issued 2 years after the signing of the Bohol Environment Code into law.

In consideration of the transboundary character of the issues, challenges and problems confronting Bohol's municipal waters, the Governor shall establish a provincial Coastal Resource Management Framework (CRMF) to guide coastal municipalities in undertaking the delineation, establishment, management and maintenance and protection of their municipal waters. The CRMF will include guidelines for conducting the following:

- Delineation of boundaries of municipal waters;
- Preparation of zoning and management plans covering municipal waters;
- Strengthening fisherfolk organizations;
- Organizational and institutional mechanisms;
- Procedures for dealing with pollution (from liquid and solid wastes) of municipal waters;
- Regulations governing recreational, educational and scientific use of municipal waters;
- Investments promotion, revenue generation and livelihood enhancement;
- Procedures for dealing with abandoned, unproductive and illegally constructed fishponds;
- Rehabilitation of mangroves;
- Development of alternative livelihood;
- Formulation, promulgation, and enforcement of fishing laws, rules and regulations; and
- Reclamation infrastructure.

In addition to the CRMF, the Governor will formulate a provincial coastal zoning and management planning guideline which will serve as the basis for developing municipal coastal zoning and management plans. The plans are to be based upon the principles of co-management, where the municipal government shall work with resource users and build upon existing laws, particularly in the institutionalization of the FARMC.

Municipal waters will be zoned according to four classifications: strict protection zones; recreation and ecotourism zones; rehabilitation or core zones; and sustainable production use zones. The zoning plan shall achieve the following purposes:

- Provide a basis for the provision of tenure to qualified coastal zone residents as a means to prevent incidence of squatting and/or unplanned settlements;
- Allocate, delineate and set aside appropriate areas for industries to secure the environmental requirements for the growth and development of coastal communities;
- Delineate areas as sanctuaries, no-fishing zones, fishing gear restriction zones, and critical breeding and feeding areas of ecologically and economically important organisms;
- Delineate natural areas for the exclusive use of specific user groups such as, but not limited to, areas for recreation, tourism, research and education;
- Delineate mangrove areas to be covered under stewardship agreements and other applicable tenurial instruments; and
- Delineate areas where construction is prohibited.

The management component of the plan will complement the zoning plan. To be holistic, the management plan should incorporate the following strategies:

- Assess the type, status, quality and quantity of coastal resources;
- Develop a community-based coastal resource management (CBCRM) approach for each municipality and provide active and continuing support to CRM activities at the barangay and household levels;
- Develop clear resource protection strategies and active law enforcement activities as provided for in RA 8550 and other existing policies;
- Create territorial use rights in fisheries and devolve these to the organized resource users for management;
- Develop sources of alternative and/or supplemental livelihood particularly micro-enterprise development while technical and financial support is obtained for plan implementation;
- Conduct information and education campaign to build awareness on CRM-related issues and government regulations on coastal resources, and inculcate environmentally sound resource extraction practices among coastal communities;
- Develop a research framework and install a municipal database for coastal resources;
- Develop community-based ecotourism enterprises and biodiversity conservation measures acceptable to the local communities;
- Undertake community organizing and social preparation measures in implementing CRM activities;
- Provide guidelines and procedures in identifying resource 'hot spots' and areas with unique characteristics, unspoiled natural state, resources or requiring immediate protection to maintain its economic, cultural, historical, social and ecological importance; and

- Provide a workable institutional arrangement to rationalize the authorities and activities of various GOs and NGOs involved in coastal management.

The province will coordinate with the DECS and the Technical Education and Skills Development Authority (TESDA) to implement a province-wide nonformal education (NFE) and skills training program for members of fishing households to increase their employment potential in non-fishing occupations.

Initial activities have yet to be conducted in relation to defining the boundaries of Bohol's municipal waters. Meanwhile, the *Sangguniang Bayan* (SB) (municipal council) of concerned coastal LGUs passes resolutions requesting the National Mapping and Resource Information Authority (NAMRIA) to provide them approved guidelines on the delineation of municipal waters.

Other Provisions for Coastal Management

The coastal zoning and management plans will require EIAs in order to secure funding from the SP. In addition, the Bohol Environment Code mandates the provision of tenurial security where applicable within municipal waters. These tenurial arrangements should recognize customary management use rights. A Water Resources Advisory Board will monitor the quality of municipal coastal waters and advise the Governor accordingly. All ordinances covering municipal waters should be systematized, and complementary in nature. The Governor will also initiate the promulgation of province-wide fishery ordinances. As a step towards this systematization, a province-wide federation of municipal FARMCs is to be organized within 1 year of the Code's adoption.

Managing the Implementation of the Coastal Provisions

In order for the provincial government to effectively manage the coastal zone in accordance to the Code, the latter creates a Coastal Resource Management Section (CRMS) under the BEMO. The functions of the CRMS are the following:

- Assist the municipal/city governments in the formulation and implementation of their municipal/city CRM plans, including the organization and federation of FARMCs;
- Assist in the physical delineation and legislation of the boundaries of municipal waters;
- Provide technical, logistical and training support to concerned LGUs and coastal communities;
- Formulate incentive system to enforce coastal management policies to complement community-based initiatives;
- Help municipalities formulate strategies which will enable communities to manage their coastal resources;
- Review, modify or amend policies based on the lessons gained from the implementation of local CRM projects;

- Develop participatory and replicable strategies in planning for coastal management;
- Integrate coastal management programs with other environmental programs;
- Assist municipal governments in setting up a permitting system for use of resources within municipal waters, including a rationalized revenue generation system; and
- Facilitate the issuance of applicable tenurial instruments to qualified resource users or managers.

Cooperative Undertakings

Section 33 of the 1991 Local Government Code provides for cooperative undertakings among LGUs to facilitate the planning and implementation of CRM within the province and among the municipalities of Bohol. It also provides a mechanism for the municipalities to group themselves and collaborate in their efforts and resources for mutually beneficial goals. Through MOAs, the municipalities can contribute funds, equipment and/or assign personnel upon approval of their respective SB.

LOCAL ALLOCATION, UTILIZATION AND REGULATION

In the profile area, there is essentially an open access system of coastal resource allocation. The users of coastal resources are generally local inhabitants. Yet outsiders are increasingly entering the area to extract products. Illegal activities such as dynamite and cyanide use, coral quarrying and illegally constructed fishponds are common within the area. In some instances, the LGU is assisted by NGOs to curb illegal activities, but where no NGOs operate, the LGU is virtually powerless to stop violations from occurring.

In theory, *Bantay Dagat* (local coast watch) and Fish Warden programs are 2 ways in which municipalities, and barangays themselves, can police the resource users, but often, the large-scale illegal fishing operators bribe their way in and out of the area. Local users end up being the only ones caught. This gives the programs a bad name among coastal communities and weakens the local political will to manage resources in a sustainable manner.

Unfortunately, laws and ordinances are not enforced equally throughout the profile area municipalities. For example, Inabanga not only seizes, but also burns, illegal fishing paraphernalia; while Getafe has weaker enforcement of fisheries laws.

While marine sanctuaries have been shown to increase fish stock and catch, there is apprehension on the part of the local users as to the perceived adverse effects upon their livelihood.

Municipal budgets are often inadequate to effectively fund CRM activities. The LGUs of Getafe, Inabanga, Clarin and Buenavista have expressed concern that their Internal

Revenue Allotments (IRAs) are not enough to support intensive, comprehensive CRM efforts because much of the budgets are allocated for public works projects, which are a visible means of providing a public service (SUML 1997). Calape, however, is leading the way with over 1 million pesos allocated for the year 2000 for CRM alone.

In some cases, there are boundary disputes over municipal waters, as in the case of the adjoining municipalities of Clarin and Tubigon.

PEOPLE'S ORGANIZATIONS AND NONGOVERNMENT ORGANIZATIONS (POs/NGOs)

There are more than 20 active women's groups in the profile area. Some of these are already working with coastal issues through the replanting of mangrove areas. In addition, there are several youth groups in Inabanga and Tubigon that have begun to work with environmental issues. Traditionally, women and children have been very effective in perpetuating the grassroots concern over environmental considerations. Therefore, these existing groups represent some of the best opportunities for caring for the environment of the profile area.

At present, there are more than 60 POs and NGOs registered with the provincial government (PPDO 1993b). In reality, the majority of these are primarily small and locally-based. See Tables 6.1 and 6.2 for a listing of the organizations.

Haribon Foundation

This Manila-based internationally known NGO is primarily a research institution. In Bohol, it works on the biodiversity of and research on seahorses in Handumon on Jandayan Islet (Getafe) and in Jao Island (Talibon). Haribon fully collaborates with Project Seahorse of Canada and with CRMP particularly on the latter's social component in 5 municipalities of the CRMP profile area, namely: Getafe (Jagoliao Island); Inabanga (Ubujan and U-og); Buenavista (Hunan and Asinan); Tubigon (Batasan and Bilangbilangan Islands); and Clarin (Nahawan and Lajog barangays).

Bohol Integrated Development Foundation, Inc. (BIDEF)

Officially registered in 1988, BIDEF has been active in grassroots consultations all around Bohol. It has more than 7 years of experience in CRM implementation. Most of its CRM efforts are concentrated in the municipalities of Loon, Calape, Talibon and Bien Unido and cover more than 40 people's organizations, 13 of which are based in Calape and in 7 barangays of Loon. The foundation is currently focusing a "federation building" and has federations in Loon, Calape, Talibon and Bien Unido.

Feed the Children

A neophyte in the field of CRM implementation, Feed the Children has adopted a very smart development process in Pangapasan and Matabao Islands, Tubigon. It has developed a community-based crab hatchery and is currently working on the establishment of the

Table 6.1. List of POs in the profile area (PPDO 1993, 1997).

CALAPE	
Charismatic Multi-Purpose Cooperative,Inc.	Calape Barangay Services Point Office Multi-Purpose Cooperative,Inc.
Flotilla Multi-Purpose Cooperative,Inc.	Rural Improvement Club
Kapunungan sa mga Mananagat sa Calape	Calape Federated 4-H Club
Ilaw ng Buhay Association of Calape,Inc.	Calape Federated Farmers' Association
Abucayan Sur Fishermen's Association	Calape Municipal Agricultural and Fishery Council
Bonbon Fishermen's Association	People's Economic Council
Bentig Fishermen's Multi-Purpose Cooperative,Inc.	*Panagtigum sa mga Inahan sa Barangay* Bentig
Bentig-Calunasan Multi-Purpose Cooperative,Inc.	*Kapunongan sa mga Inahan sa Barangay* Bonbon
Calape Community Credit Cooperative,Inc.	
TUBIGON	
Federated Rural Improvement Club	Macaas Multi-Purpose Cooperative,Inc.
Federated Parents-Teachers' Association	Retirees Services and Producers Cooperative,Inc.
People's Economic Council	Panaytayon Fishermen's Association
PROCESS	Fishermen's Association of Tubigon
Municipal Agriculture and Fisheries Council	Macaas Small Coconut Farmers' Association
Visayas Promotion Services	Potohan Fishermen's Association
Bosongon Integrated Consumers' Association	*Kapunungan sa mga Inahan sa Bag-ong Panahon*
Tubigon Loom Weavers' Association	Pooc Oriental Mothers' Association
Bohol Integrated Development Foundation	Macaas Fishermen's Association,Inc.
Buenos Aires Multi-Purpose Cooperative,Inc.	
Tubigon Retirees and Pensioners	
CLARIN	
Bacani,Tangaran,Mataub Multi-Purpose Cooperative,Inc.	
Municipal Agricultural and Fishery Council	
Clarin Teachers' Multi-Purpose Cooperative,Inc.	
FARDEC	
INABANGA	
Inabanga Retirees Association	Parents-Teachers' Association
Coconut Farmers' Association	CWL and other church-based associations
Inabanga Rural Development Cooperative	U-og Cooperative
U-og Farmers' Association	Parents-Teachers' Association-U-og
Consumers' Association	Barangay Health Workers
Market Vendors' Association	

Table 6.2. List of NGOs involved in CRM in the profile area.

- Haribon Foundation
- Bohol Integrated Development Foundation Inc.(BIDEF)
- Feed The Children
- Local Government Development Foundation (LOGODEF)
- International Marinelife Alliance (IMA)
- First Consolidated Bank (FCB) Foundation,Inc.
- Southeast Asian Fisheries Development Center - Aquaculture Department (SEAFDEC/AQD)
- Participatory Research Organizing of Communities and Education towards Struggle for Self-Reliance - Bohol (PROCESS - Bohol)

first marine laboratory in Bohol under the auspices of the Japan International Cooperation Agency (JICA).

Local Government Development Foundation (LOGODEF)
This NGO has been working in Tubigon for quite sometime now. Currently, it collaborates with Konrad-Adenauer Stiftung, a Germany-based NGO, in the implementation of a livelihood program for coastal communities. This program is currently developing a CRM framework for the municipality and implementing this in partnership with the other NGOs and POs working within Tubigon.

International Marinelife Alliance (IMA)
This Manila-based NGO attempts to reform cyanide users by introducing them to some non-cyanide fishing methods and alternative livelihood programs that may include fishing for coral groupers and buying and selling of tropical fishes. It is working in various islands in the CRMP profile area (e.g., Mantatao Island, Calape; Batasan Island, Tubigon; Hambongan Island, Inabanga), and in Tangaran, Clarin where there is a high concentration of cyanide users and where a fish sanctuary cum shellfish garden was recently established.

First Consolidated Bank (FCB) Foundation, Inc.
The FCB group has been implementing various micro-credit programs in the profile area and with Agrarian Reform Communities in Calape. This NGO is establishing linkage with CRMP through a project called Coastal Resource Enhancement through Enterprise Development (CREED) that seeks to address coastal resource degradation by introducing market-driven and environment-friendly livelihood options for coastal communities. Currently being tested and developed is an ecotour package that focuses on the river community of Cambuhat, Buenavista.

Southeast Asian Fisheries Development Center - Aquaculture Department (SEAFDEC/AQD)
Based in Iloilo, SEAFDEC/AQD designed a 3-day training module on grouper culture in cages and ponds for the fisherfolk cooperatives and fishermen's associations of Tubigon, particularly in Batasan Island and the barangays of Matabao, Cahayag, Macaas and Pandan. Its development partners include the Land Bank of the Philippines and the Department of Science and Technology (DOST).

Participatory Research Organizing of Communities and Education towards Struggle for Self-Reliance - Bohol (PROCESS - Bohol)
PROCESS works throughout Bohol. It is actively involved in organizing fisherfolk communities and initiating fishery development projects in cooperation with other development agencies and organizations. Its partner POs in the profile area are based in Loon, Calape, Tubigon and Buenavista. In the early 1990s, it linked the community theater group of Napo, Loon, with a Manila-based theater company that trained the local playwrights and performers in theater arts and management.

GOVERNMENT PARTNERSHIPS

Community-Based Resource Management Project (CBRMP)

Supported by the World Bank and implemented through the Department of Finance (DOF), CBRMP aims to reduce rural poverty and environmental degradation through support for locally generated and implemented natural resource management projects. It consists of the following components: grant and loan financing for LGU-initiated community-based resource management projects (i.e., upland agriculture and community-based forestry, coastal and nearshore fisheries, and small-scale rural infrastructure), planning and implementation support for LGUs, environmental technology transfer and policy management, and Municipal Development Fund Rural Window Initiative and Project Management. CBRMP's partners include the NEDA, DENR, DILG and DA. The municipalities of Loon, Calape, Buenavista and Getafe have made initial collaborative efforts with CBRMP. The Inabanga Rural Rehabilitation and Development Project (IRRDP) has now been approved with funding of PhP 29 million.

Agricultural Training Institute (ATI) - Japan International Cooperation Agency (JICA)

ATI is the training arm of the DA. Its collaboration with JICA through the "Training Services Enhancement Project for Rural Life Improvement" was able to establish a model site in Tangaran, Clarin where projects such as shellfish garden, alternative livelihood and fishery law enforcement have been implemented. The project will be replicated in 5 other barangays of the municipality.

SUMMARY

There are a variety of projects being undertaken by different organizations, all of whom are interested in conserving the coastal resources of northwestern Bohol. Unfortunately, there is no real coordinating body to oversee all of the CRM activities in the area. There are 2 organizations which may be able to fill the gap: the Provincial CRM Task Force (PCRMTF) and the BEMO. As was mentioned, the Bohol Environment Code gives the BEMO the jurisdiction and authority over the environment and natural resources of the province. The PCRMTF is chaired by the PENRO-DENR and consists of various organizations involved in CRM. Either one of these bodies or both working in conjunction, would be able to supply some sort of oversight to coastal management in northwestern Bohol (see Figure 6.1).

The key to a successful integrated coastal management in northwestern Bohol will be real coordination and synergy of all government organizations (GOs), NGOs, nongovernment agencies (NGAs) and POs working together under the umbrella of a strong municipal LGU with a well-defined vision and direction.

The role of the FARMC is to assist LGUs with policy initiatives and act as the municipal-wide body that ensures the active participation of the fisherfolk in all ICM-

related decisions of the LGU. This, hand in hand with an active LGU practicing CRM as one of its basic services, will ensure good CRM and the many benefits that will ensue.

Level	Coastal/Sanctuary Management	Tourism Management	Planning Advisory	Enterprise Development
National	DA DENR BFAR DOF	DOT PTA DTI	NEDA BFAR DENR CRMP	DTI TESDA DA DOF
Provincial/ Local	PLGU MLGU PENRO CENRO BFAR BEMO OPA	BEMO Provincial Tourism Council	PENRO BFAR FARMC PCRMTF CRMP Municipal TWGs	BIPC BEMO MLGU DENR BFAR OPA DSWD
PO/NGO	TWG BIDEF Haribon Foundation LOGODEF IMA PROCESS Feed the Children Fisherfolk Federations			BIDEF Haribon Foundation LOGODEF PROCESS Feed the Children Fisherfolk Federations

Legend

BEMO - Bohol Environment Management Office
BFAR - Bureau of Fisheries and Aquatic Resources
BIDEF - Bohol Integrated Development Foundation, Inc.
BIPC - Bohol Investment Promotion Center
CENRO - Community Environment and Natural Resources Office
CRMP - Coastal Resource Management Project
DA - Department of Agriculture
DENR - Department of Environment and Natural Resources
DOF - Department of Finance
DOT - Department of Tourism
DSWD - Department of Social Welfare and Development
DTI - Department of Trade and Industry
FARMC - Fisheries and Aquatic Resource Management Council
IMA - International Marinelife Alliance
LOGODEF - Local Government Development Foundation
MLGU - Municipal Local Government Unit
NEDA - National Economic and Development Authority
OPA - Office of the Provincial Agriculturist
PCRMTF - Provincial Coastal Resource Management Task Force
PENRO - Provincial Environment and Natural Resources Office
PLGU - Provincial Local Government Unit
PROCESS - Participatory Research Organizing of Communities and Education towards Struggle for Self-Reliance
PTA - Philippine Tourism Authority
TESDA - Technical Education and Skills Development Authority
TWG - Technical Working Group

Note: Only the most important agencies relevant to profile area are listed

Figure 6.1. Institutional roles for management activities in northwestern Bohol.

Chapter 7
COASTAL MANAGEMENT ISSUES and OPPORTUNITIES

As is the case in most areas of the Philippines, the natural resources of northwestern Bohol are not being used in a sustainable fashion and are therefore limited in supply. However, considerate management of the coastal ecosystems has the potential to yield substantial returns to the local populace. While the short-term priority of management is to increase the productivity of the coastal resources, the long-term management objectives should be sustainable economic growth as well as maintaining ecosystem functions and more equitable access to these resources.

The environmental thrusts of the provincial government is underscored by its vision for the province, to wit: "Bohol is a prime ecocultural destination and a strong agro-industrial province with an empowered and self-reliant people who are God-fearing, law abiding, proud of their cultural heritage and committed to the growth and protection of the environment." To achieve and sustain this vision, there is a need to continuously transform Bohol's social, political and cultural life through effective collaboration of people from various sectors of the province. One of the goals of the province is to ensure sustainable growth in revenues from major industries that adhere to a sustainable framework for developing, utilizing and managing the environment and natural resources of Bohol.

To operationalize its vision for Bohol, the provincial government endeavors to establish an effective government-private sector collaboration and partnership and an LGU organization with maximum efficiency and effectiveness in the following concerns: 1) Utilizing, developing and managing the resources of the province and the LGU; 2) Managing environmental and

natural resources for sustainable development; 3) Delivering quality services; 4) Catalyzing opportunities and creating values for investment and production; and 5) Providing for minimum basic needs. This chapter reviews the various management issues and opportunities for interventions in the profile area of northwestern Bohol.

ISSUES AND CAUSES

The northwestern coast of Bohol is a potentially productive natural ecosystem. However, the growing presence of human communities highlights the increasing need for considerate management of this area in order to yield substantial returns to the people.

The main issues revolve around destructive fishing techniques, overfishing, the relatively low productivity of agriculture and the lack of viable local employment. Future economic sub-sectors such as tourism and aquaculture have potential as community-based industries, as long as careful management is practiced so that social and environmental degradation does not occur.

The management issues raised by local resource users, community members, local government officials and nongovernment personnel are summarized as follows:

A. Biophysical

Issues	Causes
Coral reef degradation	● Unregulated blast fishing, use of cyanide and other destructive methods by fishers who are not aware of the negative effects and driven to such methods by poverty ● Harvesting of corals for small-scale industries including construction ● Destruction of habitats and spawning grounds
Declining fish population	● Water pollution ● Poverty
Overfishing/Illegal fishing practices	● Lack of awareness ● Lack of alternative livelihood ● Weak or lack of law enforcement
Degradation of mangrove areas	● *De facto* open access regime ● Conversion into fishponds, some of which have been left idle ● Agricultural/industrial expansion ● Lack of awareness of the economic benefits of mangroves ● Unmanaged or unregulated harvesting or collection of mangrove resources
Degradation of watersheds	● Improper agro-forestry techniques ● Slash-and burn (*kaingin*) farming in upland areas
Sedimentation of coral reefs	● Run off from upland areas that have been cleared for farming
Deterioration of coastal water quality	● Lack of wastewater and solid waste disposal systems ● Dumping of garbage in coastal areas/mangroves due to lack of sanitary landfills ● Lack of toilet facilities ● Increased industrial discharge
Coastal erosion	● Rampant quarrying activities ● Construction of structures on beaches and offshore
Mining	● Mostly open-pit mining; the once mined area becomes an eyesore and useless for agriculture and other uses. Under the Philippine Mining Act of 1996, over 100,000 ha have been covered by national mining permits within Bohol alone. This is almost 25 percent of Bohol's total land area of 411,746 ha.

B. Socioeconomic

Issues	Causes
Low productivity of arable land	● Eroded topsoil ● Improper land management techniques ● Poor crop selection ● Lack of certified seeds and access to high-quality planting materials ● Reluctance to try new crops/techniques
Inadequate fish stock	● Overfishing brought about by open access and lack of management restrictions ● Too many fishers ● Non-observance of fishing seasons ● Destruction of spawning grounds ● Lack of control over large-scale fishing operators encroaching on municipal waters
Increasing population density and encroachment upon non-settlement land	● Rapid population growth ● Lack of viable housing within settlement land ● Lack of awareness of the degradation of the environment and its consequences ● Lack of zoning and land-use plan
Lack of alternative forms of income generation	● Inadequate resources for studying the potential of alternative livelihood ● Inadequate resources for adopting alternative livelihood activities ● Traditional reliance for jobs in the declining agricultural sub-sector
Inadequate supply of potable water	● Lack of infrastructure ● Lack of priority for potable water system development ● Increasing population pressure on limited water resources ● Contamination of ground water by coliform and saltwater

C. Institutional

Issues	Causes
Overlapping/Conflicting coastal resource management responsibilities of government agencies	● Poor coordination between and within LGU departments, government agencies, NGOs and POs, and lack of understanding of each other's roles and jurisdiction ● National laws or bodies supersede their local counterparts (e.g., the management of mangrove areas within municipal boundaries falls within the jurisdiction of national agencies)
Inadequate planning and implementation and monitoring capability of LGUs	● Lack of trained personnel, financial resources and equipment ● Lack of political will ● Lack of multi-year and multi-agency CRM plan based on actual issues and site-specific problems
Lack of community liaison/organizing experience	● Lack of awareness of the need for liaison/organizing ● Lack of local leadership ● Traditional reliance on doleouts and top-down management approaches ● Weak organization in community organizations and LGUs ● Lack of institutional strengthening capability

D. Legal

Issues	Causes
Poor enforcement of existing regulations	● Confusion over national and local laws (e.g., which fishing gears are illegal and which are not; the fine to be imposed varies between local and national levels) ● Lack of properly trained personnel ● Political interference ● Lack of community awareness of relevant regulations ● Lack of priority for coastal law enforcement among law enforcement agencies
Limited definition of coastal zone	● Lack of awareness of the interrelationships between coastal and land ecosystems
Conflicting regulations on CRM	● Lack of coordination and collaboration among neighboring LGUs in law enforcement and standardization of CRM legislation
Ignorance of existing regulations	● People's general lack of awareness and education on such regulations

OPPORTUNITIES

A well-planned CRM plan can bring about a wealth of benefits such as healthier coastal resources directly leading to healthier communities, cheaper and more abundant food, more equitable access to resources and food security, to name a few. With these paybacks, it is hoped that the top government officials and their employees as well as leaders of coastal communities and their development partners will continue advocating for better coastal management practices. As the efforts of these concerned entities intensify, it is hoped that each municipality in the profile area will become a model for CRM within Bohol.

Looking at the bigger picture, there is a great opportunity for the LGUs to close ranks and gain the benefits of a more coordinated CRM over larger areas. Migratory fishes know of no political boundaries and are contiguous, thus managing them across borders is much more beneficial and cost-effective in the long run. If the LGUs can do this in northwestern Bohol, they will be producing a network of valuable CRM "showcases" which should serve as model for the rest of Bohol. Meanwhile, each municipality in the profile area has its own "CRM highlights". It is hoped that the LGUs will build on these developments to achieve the more elusive CRM showcase that Bohol and the rest of the Visayas badly need.

ONGOING "SHOWCASES" IN THE PROFILE AREAS

Loon

The local governance of Loon is led by an alliance of young and energetic administrators and legislators. The CRM efforts initiated in the mid-1990s under the guidance of then Vice Mayor Cesar Tomas M. Lopez have been carried on to the present when the latter became municipal mayor. With Vice Mayor Raul Barbarona at its helm, the FARMC of the municipality is one of the most active in Bohol. In fact, the strength of the FARMC paved the way for Loon's inclusion as a CRMP expansion town. Meanwhile, SB Member Felix Marcojos is initiating local legislation on CRM with the support of the other pro-CRM municipal officials.

Using a participatory approach and through a series of consultations with the coastal communities, the FARMC has solved a variety of issues affecting CRM in Loon. These include illegal intrusion of large-scale fishing operators into municipal waters, rampant construction of *payaw* or FADs and use of corals in the 'stone-washing' of denim for the progressive garment industry of the municipality.

The CRM program has been initiated by the LGU with the help of a local NGO. Presently, several good community-based CRM practices have been set in place. Among these are proper mangrove management, small enterprise development, and marine protected areas. With its large number of coastal and island barangays (31), which is almost one-half of the total number of barangays (67), Loon offers a good opportunity for replicating these

practices. A very strong and committed local leadership will ensure that such practices will continue into the future.

Meanwhile, the Philippine Navy has "adopted" the waters off Loon as a priority area for environmental rehabilitation along with 6 bays in the Philippines. The Navy's "Adopt a Bay" project was launched on 18 May 1999 and is covered by Letter of Instruction 12-99 issued by Vice Admiral Eduardo Ma. Santos, the Philippine Navy Flag Officer in Command.

Loon has great potential for ecotourism. Cabilao Island, for example, is frequented by many local and foreign tourists specifically for its being identified as one of the top 5 dive spots in the Visayas. The LGU plans to involve the divers in marine protection through a system of fund collection to support a local team that patrols the area to discourage any form of destruction and maintain its pristine condition. Nearby is Mualong river that offers a beautiful cruise along well-preserved banks up to its upper nooks until one reaches a beautiful waterfall.

Calape

The tandem of Mayor Julius Caesar Herrera and SB Member Gerardo Cuadrasal Jr., as well as the lawyer mayor's influence through the League of Municipalities of the Philippines (LMP), has brought very favorable developments to Calape as regards CRM. Mayor Herrera is president of the LMP-Bohol Chapter and vice president for operations of the national chapter. Cuadrasal is chairman of the Environment Committee and vice chairman of the Fisheries and Agriculture Committee of the SB alongside Vice Mayor Gaudencio G. Marapao. The rest of the SB members are also pro-CRM.

In terms of good CRM practices, Calape has 4 protected marine areas, 2 of them very well managed. BIDEF, a local NGO, has launched a livelihood program and organized a fisherfolk federation. The BFAR-managed Calape Fishery Complex focuses on the development of culture technologies for fish and other economically important marine organisms. The LGU, in coordination with CRMP, is assessing the culture of seaweed (*Eucheuma* spp.) on Mantatao Island in an attempt to produce a sustainable alternative enterprise that can replace present sources of income. Meanwhile, Pangangan Island is DENR-CENRO's very successful pilot site for its CEP. Boosting the municipality's advantage are 2 campuses of the CVSCAFT. The CVSCAFT is mandated to perform the 3-fold function of training, extension and instruction on agriculture and allied sciences including fishery.

In view of the many agencies working on CRM in Calape and the importance of pursuing common directions and defining a unified goal in line with the thrusts of the LGU, the latter established the first Coastal Resource Management Office (CRMO) in Bohol. Despite being a new unit, the CRMO now has a staff and has acquired a budget and equipment. The CRMO was created due to the realization of the LGU that the coastal area of Calape is almost as large as its land area, yet it never had resources allocated for its

management. This coastal "workhorse" of Mayor Herrera is envisioned to provide information and mechanisms to guide the LGU in planning for the management of its municipal waters.

Mayor Herrera's commitment to CRM has been manifested not only through his full-force advocacy within the provincial and national chapters of the LMP. He has outdone himself by going beyond advocacy, allocating PhP 1 million for the CRM activities of Calape for the year 2000. This sets a very good example of a high commitment to CRM within Bohol.

Tubigon

The municipality seems to have the longest experience in CRM compared to the other profile areas as it started its focus on CRM during the early 1990s. Sustaining the leadership of the past administration are the present mayor, Paulo Lasco; Vice Mayor Renato C. Villaber; SB Member Gerardo F. Chagas, who is vice chairman of the SB Committee on Fishery and Agriculture; MPDC Noel Mendaña, who is the CRM action officer of Tubigon; and MAO Epitacio Mumar, who chairs the FARMC. These persons paved the way for the development of a good CRM program and the entry of NGOs and projects such as Haribon Foundation, Feed the Children, LOGODEF, IMA and CRMP which have been helping the LGU implement their CRM projects.

LOGODEF is presently helping launch a series of mariculture projects. A Technical Working Group (TWG) headed by the mayor is now preparing a 5-year participatory ICM plan for the municipality which already has its own environment code. Once finalized, this plan will be the first for Bohol. CRMP is working in 2 pilot barangays, Batasan and Bilangbilangan, through the Haribon-CRMP-Project Seahorse collaboration. On the other hand, Tubigon's boundary dispute with Clarin as regards "*Lima ka Pulo*" (Five Islands) remains unresolved and could trigger a threat to the smooth implementation of the LGU's CRM plan in the future.

Clarin

Clarin is catching up fast in CRM because of the active support of Mayor Trifon Sanchez and Vice Mayor Teresita Aron. A Municipal Fisheries-TWG composed of all organizations involved in CRM serves as the LGU's 'think tank'. This TWG was able to obtain financial support from JICA for some community-based CRM projects implemented in collaboration with the ATI of the DA. One of such projects is a shellfish sanctuary which is probably one of the first of its kind in Bohol. Currently, the CRMP-Haribon partnership is implementing a CBCRM project in the barangays of Lajog and Ubojan. Also, a very strong organization of fish wardens has been working well for the last 2 years. This group was able to derive assistance from the BFAR for implementation of a fish cage project on the above mentioned 5 islands. They are also patrolling regularly to minimize the once rampant illegal fishing in the area.

The CVSCAFT has a satellite campus in Clarin that offers a special course in CRM, another first for Bohol. Formerly the Clarin School of Fisheries, the school will now be involved in fishery research and extension, in addition to education/instruction, as mandated in its charter. This will be a good opportunity for producing CRM graduates and linking with all the other CRM initiatives in Bohol.

There is currently a municipal boundary dispute with Tubigon, although Clarin's coastal area has been declared under the NIPAS Act, thus under the jurisdiction of the DENR through the Protected Areas Management Bureaus (PAMB). This issue has been raised to the courts for resolution. It is hoped that a workable compromise between the 2 LGUs shall be adopted. Furthermore, the municipality has yet to flex its muscles with regard to passing ordinances related to CRM and fisheries. In fact, only 1 coastal related ordinance is in effect in Clarin. Institutionalizing CRM in the LGU through ordinances is thus urgent in view of the impending election for local officials.

Inabanga

The dynamic and progressive leadership of Mayor Josephine Socorro Jumamoy, alongside a very supportive vice mayor and SB, has introduced some interesting changes in the local governance of Inabanga. With a no-nonsense campaign against illegal fishing launched just 6 months after her entry as mayor, the lady executive has literally cleaned Inabanga of illegal fishing operators many of whom have transferred their activities elsewhere. Ably assisting the mayor in strictly implementing fishery laws is SB Member Francisco L. Alesna Jr. who chairs the SB Committee on Fishery and the FARMC. The latter has established a system of remunerating the fish wardens from a certain percentage of the fine imposed on the arrested violators, which has provided an incentive to stamping out illegal fishing.

Inabanga is Bohol's first recipient of a 30-million loan-grant-equity mix from the World Bank/Government of the Philippines (GOP (through the DOF). The financial assistance shall be used over a 3-year period for the implementation of coastal and upland projects as well as small infrastructure under the CBRMP. With 7 coastal barangays as initial project sites, the CBRMP shall focus on reforesting 147 ha of mangrove and establishing 2 marine sanctuaries. The municipal mayor spearheads the implementation of the CBRMP through the Inabanga Resource Rehabilitation and Development Project with SB Member Hermogenes Cenabre Jr. as project manager. The 33-member Cagawasan Mangrove Association, on the other hand, has been awarded a Community-Based Forest Management Agreement (CBFMA) covering 160 ha of mangroves along 1.4 km of shoreline.

The Haribon Foundation implements activities in the coastal barangays of U-og and Ubojan. It has coordinated with the LGU in response to the latter's need for appropriate CRM projects. On the other hand, the town's boundary dispute with Clarin in relation to some islands needs to be resolved to ensure a smoother CRM implementation over the coming years.

Buenavista

The active partnership of Mayor Leandro Tirol and Vice Mayor Apolonio Aparece, and the support provided by Hon. Romeo Torregosa and his colleagues in the SB; MPDC Efren Logroño, chairman of the FARMC; and Lino Divinagracia, the only MAO in the profile area with a degree in fisheries, have made the implementation of CRM easier and smoother.

With most of its natural resources intact, Buenavista has embarked on ecotour promotion. In cooperation with the enterprise development component of the CRMP, an oyster farm cum ecotour destination has been established in the Cambuhat river community in collaboration with the FCB Foundation, Inc., the LGU and the barangay council. Partnerships with interested groups are currently explored in support of this endeavor including that with the Bohol Federation of Travel and Tour Operators.

The SB has a good selection of municipal ordinances which include the declaration of the Daet river as a marine reserve and banning the collection of *donsol*, a local sea hare that bears a delicious egg case. *Donsol* is believed to possess properties that can prevent cancer albeit the absence of any scientific evidence.

Like Inabanga, Buenavista has also received initial funding for the World Bank/GOP (DOF)-assisted CBRMP in 5 of its 8 coastal barangays. The large tract of mangroves warrants inclusion in the community-based forest management program of the DENR. An aquasilviculture project in the barangay of Hunan, which is supported by the regional office of the DENR, is worth exploring for possible replication. The CRMP through its partnership with Haribon is working in Asinan and Hunan as model barangays for community-based CRM.

Getafe

Getafe's inclusion as a CRMP expansion area in 1997 is attributed to its many coastal areas -- 11 coastal barangays and 8 island barangays. At the helm of this municipality are Mayor Cariso Camacho and Vice Mayor Simeon Torreon who are ably supported by MAO Abundio B. Melencion and SB Member Carmelin Abay, chairman of the Committee on Fisheries and CBRMP project officer.

Getafe is well-known for its Banacon Island, which is considered as having the largest mangrove reforestation in the Philippines. Although a protected area under the NIPAS Act, the island is now in the process of being subject of a CBFMA between a PO (i.e., Banacon Fisherfolk and Mangrove Planters Association with 75 members) and the DENR. The covered area is estimated at 1,775 ha along 11 km of shoreline. Banacon, however, is under dispute as the LGU would like to develop its ecotourism potential and there are moves to declare it as an ecotourism zone through the Philippine Congress.

The municipality has other CRM activities, such as: DENR-CEP on Mahanay Island; seahorse sanctuary of Haribon's Project Seahorse in Barangay Handumon on Jandayan Island; CBFMA in Nasingin; and establishment of several marine sanctuaries. Meanwhile, many fishers from the municipalities that have totally banned illegal fishing (e.g., Inabanga) have encroached on Getafe's municipal waters, thus requiring the active involvement of the fish wardens. Worthy of attention and protection is the only double barrier reef in the Philippines -- the Danajon Bank composed of the Calituban and Caubyan reefs, both of which touch on Getafe's municipal waters.

Provincial Opportunities

Bohol's popularity as a pilot site for CRM/ICM projects is proven by the many developmental projects in progress or proposed for Bohol. The BEMO illustrates the potential for more concerted activities in the future. CRMP has recently drawn up a Memorandum of Agreement (MOA) with the province, the BFAR and DENR will operationalize the BEMO's mandates. Serving as a 1-stop shop for environmental initiatives, the BEMO is expected to form an umbrella for all CRM activities in Bohol and act as synthesizer and standardizer of Bohol's CRM initiatives. It shall also monitor and evaluate these activities and draw lessons from them.

The recently launched CBRMP which derives financial support from the World Bank through the DOF also offers a wide array of opportunities for Bohol's coastal and upland areas. The municipalities of Loon, Calape, Inabanga, Buenavista and Getafe have already made commitments and begun to work with CBRMP's Cebu-based management group. Seven other coastal municipalities are currently at varying stages of application.

The PCG also offers another opportunity for marine protection and fishery law enforcement. It has more than 45 full-time staff working in the province, with headquarters in Tagbilaran and sub-offices in the ports of Catagbacan (Loon), Tubigon, Getafe, Pres. Carlos P. Garcia, Jagna and other towns.

Six Bohol schools, 3 of which focus on fishery education, have been converted into the CVSCAFT system. Being a state institution, the CVSCAFT is qualified to receive appropriations from the national budget for staff development and facilities improvement, and become a member of regional and national research and development consortia. This provides the college an opportunity to present its research and extension plans and outputs to the experts thus improving the capability and credibility of its research and development staff. This process also makes the thrust of the college more responsive to the development interests of the province and the LGUs.

Also active at the provincial level is the PENRO-chaired PCRMTF. Its members come from all agencies that have jurisdiction over coastal-related issues.

The SP recently passed Resolution No.99-618 creating a Sub-Committee on Marine and Coastal Resources for legislation purposes. There is now a CRM liaison officer based at the Special Projects Unit of the SP. This milestone act of the SP manifests the local governance's support for the environment as mandated in the Bohol Environment Code.

RECOMMENDATIONS

To meet the challenge presented by the coastal management issues in northwestern Bohol, the following strategies promoting good CRM practices are recommended:

1. LGU Budget Allocations

CRM activities must be included in the development plan of the municipality for budget outlay purposes. Based on the current levels of LGU funding, a minimum of PhP 250,000 is being allocated for CRM within northwestern Bohol. Considering that municipal waters are wider compared to land area, this amount is disproportionately small. In LGUs which have no aquaculture technician, it is strongly advised to assign at least 1 person, preferably a Fishery graduate with CRM experience, at the MAO to handle CRM matters.

2. Organization of CRM-focused Groups

The Philippine Fisheries Code of 1998 mandates that the FARMC should be the lead organization for matters concerning the management of and policy decisions for the municipal coastal resources. It should work together with the SB to strengthen policy guidelines on CRM. As provided in the Bohol Environment Code, the BEMO shall organize the FARMC and orient its members on their respective roles. Municipal FARMCs should also be equipped with capability-building skills.

Although facilitated mostly by NGOs, the organization of barangay FARMCs should be given attention by the LGUs because they are essential for institutionalizing and sustaining the various community initiatives and projects such as marine sanctuaries and mangrove forests. Barangay-based POs including FARMCs should also be given a strong voice at the municipal level through their federated organizations. NGOs should gradually and effectively phase out from the community to enable the POs to chart their own development by themselves.

In municipalities where there are several groups conducting CRM-related activities and where CRM issues require special attention, organizing Municipal Technical Working Groups (MTWGs) is recommended to coordinate all their efforts. The MTWG may be headed by an LGU representative and its members may come from the FARMC, SB Committees on Fishery and/or Environment, MAO, Municipal Planning and Development Office (MPDO), DENR, BFAR, NGOs, PO federations, and other qualified groups. Quarterly and special meetings are recommended for the group.

The LGUs may decide to split into districts and form their own management group. There is a strong logic behind the LGUs working together to attain a common objective.

3. Participatory Coastal Resource Assessment; Monitoring of Fishery Status and Trends

A municipality or barangay derives valuable information from the results of a PCRA which should be a planning requisite. If supported with relevant maps and other illustrations, and properly consolidated and validated, such information is significant in participatory CRM planning for the municipality or barangay. This information should also be combined with the municipal coastal database and the natural resources database maintained by the BEMO.

After every PCRA, the LGUs, POs or fisherfolk associations should be encouraged to conduct regular (i.e., annual or biannual) assessments of their coralline areas, seagrass beds or mangrove ecosystems. Fish catch and fishing efforts should be monitored by using appropriate methodologies similar to those employed by the Feed the Children in Tubigon. Whenever necessary, there should be involvement of the whole community, GOs (e.g., DENR-CEP, BFAR), NGOs or even educational institutions such as the CVSCAFT. A system of registration of all fisherfolk within the municipality may be adopted to facilitate monitoring of fish catch and other trends. Tubigon is currently adopting a good licensing system for this purpose. A marine protected area monitoring scheme for communities is also being conducted in Lomboy on Pangangan Island in coordination with the University of the Philippines Marine Science Institute. Similar initiatives should be replicated in other areas.

4. Strengthening of Legislation and Law Enforcement

Municipal legislation on CRM should be given favorable attention. Such legislation may cover prohibition against illegal fishing practices and coral or sand quarrying, licensing of current and new municipal fishers, establishment and management of fish sanctuaries, declaration of open and closed seasons for fishing, creation and recognition of CRM advisory bodies/councils, and establishment of municipal trust funds for CRM. The latter should be established for the fines collected from the arrested violators. The collection should be deposited in this trust fund instead of the general fund so that it could be properly monitored and used to maintain the patrolling activities and other CRM-related efforts.

Fishery laws should be strictly enforced and all arrested violators treated equally with regard to imposition of penalty and fine. It seems that swift, painful and public enforcement is the most lasting and effective. Law enforcement should also be done in coordination with the fish wardens now deployed by some LGUs of the profile area.

Each LGU should be equipped with at least 2 motorized patrol boats, gasoline and maintenance funds. The *Bantay Dagat* team must also be provided with communication equipment and modest honoraria and insurance. A composite team of fish wardens, FARMC members, barangay and municipal officials, and the PNP members seems most effective.

Also, a strong linkage with the PNP-MARICOM should be established. All these law enforcers should participate in para-legal training and other capability-building activities. Together with the market personnel, they may also be trained in detecting fish caught through illegal means. Such fish should be rejected or confiscated. Consumers should also be informed of the danger of eating poisoned fish and the impact of illegal fishing.

Guardhouses are necessary while appropriate areas for routine checks have to be identified. It is advised that each LGU should assign not less than 4 PNP members for law enforcement, with 2 assigned during each shift (i.e., day and night). The carrying of firearms by the civilian members of the patrol team should be discouraged. Only the PNP personnel should be allowed to handle firearms.

Inter-municipality agreements that allow a patrol team of an LGU to pursue and arrest violators in waters within another LGU's boundary should also be encouraged. A combined law enforcement program for Cebu and Bohol is recommended. This should be developed by concerned provincial, regional and national partners. Cebu City has a very active *Bantay Dagat* Task Force which can be tapped to support inter-LGU collaboration.

5. Establishment of Marine Sanctuaries and Other Protected Areas

Well-protected marine sanctuaries are practical tools for the rehabilitation of coastal resources. Each LGU should try and declare at least 1 protected area through a community-based participatory process involving all affected stakeholders and members of the community. The latter, however, should prepare a good management plan and draft a resolution requesting the appropriate municipal or provincial legislator to file an ordinance declaring certain areas as protected.

A fish sanctuary is a lifetime commitment, thus a lot of information dissemination and community consultations will be required. A good way of involving persons in the process is taking them to a model site where they can observe good practices and interact with the community. In the profile area, the recommended well-managed sites, all of which are over 3 years old already, include the following: Barangay Cabacongan on Cabilao Island and Barangay Calayugan Sur on Sandingan Island (Loon); the barangays of Lomboy and Magtongtong on Pangangan Island (Calape); and Barangay Handumon on Jandayan Island (Getafe).

6. CBFMAs for Mangrove Areas

Households of coastal communities near mangrove areas should be encouraged to apply for stewardship contracts with the DENR. Good examples are in Nasingin Island, Getafe (with over 300 ha awarded to qualified community members) and in Kagawasan, Inabanga (with 160 ha).

Through the CBFMAs, the stewards will be able to manage and protect as well as practice alternative livelihood options such as production of roofing materials (i.e., *nipa* thatches), culture of mud crabs, collection of wood for fuel and construction purposes, concoction of herbal medicine, harvesting of foliage for cattle feeding, production of *tungog* (natural dye for *tuba* or coconut toddy), and establishment of bird and wildlife sanctuaries for ecotourism. Their 25-year stewardship and traditional management techniques should prove to ensure the sustainable use and protection of the remaining mangrove forests of Bohol.

7. Fishpond Conversion

Following the mandated process, fishponds that are illegally constructed and/or left idle should be recovered and turned over to the community for appropriate management. A provincial TWG headed by the BFAR has been established to initiate this process, which should be started as soon as possible. Current BFAR data show that there are about 1,257 ha of permitted fishponds in Bohol, yet there are more than 2,100 ha of illegally constructed ones in the province.

8. Enterprise Development Activities

Alternative or supplemental activities should be explored in view of the decreased fish catch and the need to reduce dependence on the degraded coastal resources. Some potential products or activities worth considering are seaweed (*Eucheuma*) farming for Jandayan (Getafe), Batasan (Tubigon) and Mantatao (Calape); mariculture products such as oyster for Cambuhat (Buenavista) and Inabanga; mud crab fattening for Inabanga and Buenavista; small-scale production of fish in cages; and ecotour development for Cabilao Island and Mualong river (Loon) and Cambuhat. For all these possibilities, funding has to be made available. The OPA, BFAR, DENR and other government agencies can be tapped for this purpose along with local or international development-oriented NGOs.

9. Seminars, Workshops, Training Activities and Other IEC Strategies

ICM/CRM workshops, training activities and other IEC strategies should be conducted or implemented for the various stakeholders through appropriate venues. These should focus on community leadership, fishery laws, participatory planning and zoning, roles and responsibilities of FARMC, PAMB jurisdiction, alternative livelihood, fish sanctuary management, resource management and other best-of-the-moment practices. Each activity should be preceded by a training needs assessment and should complement the various ongoing activities in the barangay or municipality.

10. Monitoring of Organizations and Projects Assisting the CRM Activities of LGUs

LGUs should be encouraged to participate in the planning process of GOs and NGOs especially if these groups operate within their jurisdiction. It is also important that the LGUs should receive reports/outputs from these agencies and keep records of their assistance. In Tubigon, there at least 5 NGOs working with coastal communities and

advocating ICM/CRM approaches.With the assistance of the BEMO and through effective monitoring and coordination,the role of each NGO has been properly defined in relation to those of the others.When properly coordinated,all agencies can work together under the CRM umbrella of the LGU.

The doleout system should be discouraged.NGOs should coordinate fully with the municipal LGUs and can even request counterpart funding from the latter.A good example of an effective collaboration is presented by the Tubigon LGU which gave a PhP 200,000 counterpart to LOGODEF and PhP 100,000 to Feed the Children for their CRM activities within the town.

11. Delineation of Municipal Water Boundaries

LGUs must collaborate with the DA-BFAR and NAMRIA in defining their municipal waters. The Tubigon-Clarin and other disputes should be resolved by the appropriate government agencies as soon as possible.Buenavista and Inabanga also need to delineate their boundaries as there are inconsistencies in their respective municipal maps vis-à-vis their water boundaries.

12. Integrated Coastal Management (ICM) Planning

It is strongly recommended that each LGU should conduct a participatory development of a multi-year ICM plan for at least 5 years such as those being developed by Calape and Tubigon.The following are some of the activities recommended for inclusion in an ICM plan as well as their objectives and strategies (Yambao 1999).

ICM planning is a process of comprehensively studying resources,economic activities and societal needs,including problems and opportunities in the designated planning area or zone and proposing future actions (Clark 1995).It is a process of organizing ideas and resources to make things happen.Two questions are important to be answered in planning: (1) What do you want to happen? and (2) How do you want it to happen?

An ICM plan for any area (barangay, municipality or city, multi-municipal wide) requires basic contents to make a good plan.The essential parts of a good plan follow (White 1999):

1. **Description of the area** provides background information.This can include geography, demography,important coastal resources and their condition,socioeconomic status of the people,institutions and laws and other relevant information for management.
2. **Maps** of different scales are needed.Include a map of the entire area and detailed maps of the coastal area with resource locations and use patterns,existing management interventions and other data.
3. **Management issues** must be clearly stated along with their contributing causes and factors.Trends in decline of resources can be used to illustrate issues of concerns.

4. **Goals and objectives** should derive from the main issues. The goal is broad while each objective must be achievable and measurable within the 3-to-5-year life of the plan.
5. **Strategies and actions** are the heart of the plan. One strategy and several actions with assigned responsibilities should address each major issue. A strategy is a well-conceived means to solve a problem. The actions implement the strategy. Actions can be budgeted.
6. **Institutional and legal framework** is needed to support plan implementation. This section explains what institution is responsible and why as supported by law.
7. **Timeline** for implementation helps organize all responsible parties to implement the plan.
8. **Monitoring and evaluation** must be included as a set of activities to provide feedback on plan implementation and impact on environment.

The following are some of the basic programs and strategies on coastal management. A number of strategies have been proven technically feasible and are being implemented in some LGUs. However, aside from looking at the technical feasibility of each program and strategy, social acceptability is also important. Note that the success of program implementation lies on both technical feasibility and social acceptability.

Strategies are not exclusive to one program. There are strategies that can be used in 2 or more programs, such as the establishment of sanctuary -- a strategy in fisheries management and in habitat management. There are also cross-cutting strategies, such as IEC and community organizing, that are applicable in all programs. The strategies can be operationalized through specific activities and actions.

Table 7.1. ICM planning.

Activities/Objectives	Strategies
1. FISHERIES MANAGEMENT • To increase productivity of fishery resources to support food security • To regulate access to the municipal waters and reserve the resources therein for the benefit of the municipal fishers • To regulate the exploitation of fishery resources and limit fishing effort to sustainable levels • To ensure the rational and sustainable development and management of fishery resources • To develop monitoring, control and surveillance mechanisms and strengthen law enforcement units • To ensure equity in fisheries exploitation	• Establishment and management of marine protected areas or fish/marine sanctuaries • Designation of closed season in harvesting commercially and ecologically-important fish and invertebrates during their spawning season and/or their juvenile stage • Designation of closed areas for identified migration routes of commercially and ecologically-important fish • Licensing and permitting of fishers, fishing gears and fishing boats • Sustainable management of coastal aquaculture • Regulation of the deployment, use of and access to artificial reefs • Regulation of the construction and operation of fish corrals, other fishing gears and fishing activities that occupy space in the coastal waters • Restriction of commercial fishing vessels in the municipal waters • Enforcement of environmental and fishery laws • Setting up of fisheries monitoring mechanism • Conduct of massive IEC campaign • Community organizing and formation of fishers' organization for protection and conservation

Activities/Objectives	Strategies
2. HABITAT MANAGEMENT ● To protect, conserve and rehabilitate existing habitats ● To improve productivity and biodiversity of coral reefs, seagrass beds, mangroves and estuaries ● To enhance community participation in the management of the habitats	● Establishment of marine protected areas for coral reefs, seagrass beds and mangroves ● Management of mangroves under the CBFM framework ● Protection of seagrass beds by regulating fishing activities destructive to the habitat ● Enforcement of environmental and fishery laws ● Conduct of massive IEC campaign ● Community organizing and formation of fishers' organization for protection and conservation
3. COASTAL ZONING ● To delineate zones for specific uses or activities in the municipal waters ● To eliminate use conflict in the utilization of the municipal waters ● To regulate activities in the different zones	● Boundary delineation of municipal waters ● Designation of zones for specific uses (i.e. strict protection, rehabilitation, aquaculture, tourism, trade and navigation, etc.) ● Regulation of fishing activities and use of fishing gear in every zone ● Conduct of massive IEC campaign ● Community organizing and formation of fishers' organization for protection and conservation
4. SHORELINE MANAGEMENT ● To protect the shoreline from further degradation due to destructive activities ● To maintain access of the people to foreshore area ● To regulate activities in the foreshore area that would affect the condition of the shore ● To minimize erosion and loss of beach to natural and human-induced forces	● Regulation of sand and coral mining ● Protection and conservation of mangroves ● Setting up and maintenance of coastal setbacks for all development activities ● Conduct of massive IEC campaign ● Community organizing and formation of fishers' organization for protection and conservation
5. COASTAL TOURISM MANAGEMENT ● To provide economic incentives for the municipality and the coastal communities by optimizing the tourism potential of certain areas ● To develop local capability in ecotourism projects that contribute to better coastal management and community development ● To develop incentives for resource conservation	● Watershed management ● Regulation of the number of tourism facilities and activities ● Maintenance of waste disposal facilities ● Ecotourism product development ● Visitors education and management ● User fees and appropriate business development ● Conduct of massive IEC campaign ● Community organizing and formation of fishers' organization for protection and conservation
6. ENTERPRISE AND LIVELIHOOD MANAGEMENT ● To develop alternative and supplement employment for fishers to lessen their fishing effort and pressure on the sea ● To diversify income sources of the fishers to lessen dependence on fishing ● To develop environment-friendly enterprise and livelihood projects	● Identification and implementation of environment-friendly and economically-feasible projects ● Identification of beneficiaries
7. WASTE MANAGEMENT ● To minimize the potential adverse impact of wastes on human and environmental health.	● Water quality monitoring ● Domestic waste segregation ● Sewage waste treatment, especially for tourism and industrial facilities ● Monitoring, control and surveillance ● Conduct of massive IEC campaign

Activities/Objectives	Strategies
8. LEGAL ARRANGEMENTS AND INSTITUTIONAL DEVELOPMENT ● To improve mechanisms and arrangements for local governance on coastal management ● To enhance community participation in coastal management planning, legislation, implementation, monitoring and evaluation ● To strengthen environmental and fishery law enforcement ● To improve the delivery of coastal management-related services ● To strengthen network and linkage with other LGUs, national government, international and local organizations, and community and people's organizations	● Legislation for comprehensive CRM ordinances ● Formation and strengthening of POs ● Strengthening of FARMC, *Bantay Dagat* and fish wardens ● Monitoring, control and surveillance ● Training and staff development on CRM ● Conduct of IEC ● Funding

13. Licensing of Municipal Fishers

The Fisheries Code of 1998 authorizes the licensing of all fishermen and their gear. The scheme to accomplish this licensing follows:

SUBMISSION OF THE FOLLOWING TO THE MUNICIPAL AGRICULTURAL OFFICE

1. Accomplished application form indicating the name of the applicant, address, name and type of fishing gear, tonnage of fishing boat, and nature of fishing activity
2. Community Residence Certificate (for individuals)
3. Certificate of Registration (for organizations/cooperatives)
4. Barangay Clearance
5. Certification as a Registered Municipal Fisher
6. Other pertinent documents such as:
   - Registration papers for motorized boats
   - Location plan (for fish corrals, fish cages and other similar structures)

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EVALUATION AND ASSESSMENT OF THE APPLICATION

1. Evaluation of the correctness and veracity of the information written in the application form and in other documents submitted
2. Site evaluation (for fish corrals, fish cages, fish pens and other similar structures)
3. Environmental Compliance Certificate, if applicable
4. Assessment of fees

Based on the evaluation and assessment of the application, the MAO may recommend to the Mayor any of the following:

- Issuance of the license/permit
- Non-issuance of the license/permit
- Deferment of the issuance of the license/permit subject to further evaluation and assessment

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PAYMENT OF FEES TO THE MUNICIPAL TREASURER'S OFFICE

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Continued

ISSUANCE OF FISHERY LICENSE/PERMIT BY THE MUNICIPAL MAYOR

The Fishery License/Permit should contain the following minimum information:

- Fishing gears that will be used by the licensee
- Tonnage and code of the fishing boat
- Types of fishing activities
- Duties and responsibilities of the licensee
- Grounds for the cancellation of the license/permit

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MONITORING, CONTROL AND SURVEILLANCE

14. Other Possible Activities

- Develop and implement municipality-wide zoning plans;
- Make operational PAMBs and their regular monthly meetings;
- Rehabilitate uplands through Sloping Agricultural Land Technology (SALT) and stewardship agreements for watersheds, erosion and siltation control, management of wastes from households and beach/coastal resorts, and other activities that have effects on the coastal environment;
- Establish municipal coastal resource management offices and databases;
- Organize cross-visits to sites that showcase good CRM implementation, ecotourism, livelihood enterprises, well-protected marine areas and other features; and
- Participate in the national search for Best CRM through the League of Municipalities of the Philippines.

COORDINATION

It is important to stress that within Bohol there are already more than enough human and financial resources to implement good CRM practices. One thing that is glaringly obvious, however, is the lack of coordination among the various GOs, NGOs, NGAs and other entities that has led to the replication of activities. Generally, everyone is constantly going through the CRM process "reinventing the wheel" time and time again. Recently, however, coordination among concerned entities has improved. The different sectors and agencies are beginning to see that coordination is a "win-win" situation for all concerned.

The Local Government Code and the Fisheries Code have given the LGUs much control over their coastal resources. Thus, the key to a successful implementation of CRM in the profile area is the municipal LGU. The latter needs to have a clear and defined multi-year CRM vision and plan. Once it has this, it can pull in all concerned NGOs, POs, GOs and GAs to define their roles, harmonize their programs and realign them towards the LGU's CRM plan, share resources and coordinate properly under the LGU umbrella.

SUMMARY

The baseline information contained in this coastal environmental profile provides the foundation for ICM planning. The planning process is designed to integrate all the user groups and government agencies so that comprehensive management can be carried out successfully with full participation and willingness by the coastal communities of northwestern Bohol. The plans are meant to be flexible and open to change with management needs and as new user groups join the process. With the planning process in place, it should be possible for local coastal communities to sustainably manage their resources and improve their quality of life.

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